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NAVAL POSTGRADUATE SCHOOL

Monterey, California

HYDROGRAPHIC DATA FROM THE OPTOMA PROGRAM
OPTOMA11
5 JUNE - 5 AUGUST 1984

by

Paul A. Wittmann
Michele M. Rienecker
Edward A. Kelley, Jr.
Christopher N.K. Mooers

March 1985

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Monterey, California 93943

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The six cruises and one aircraft flight comprising OPTOMA11 were undertaken in June, July and August 1984 to sample two subdomains of the California Current. This report presents the hydrographic data, acquired by XBT, AXBT and CTD casts, from the cruises and the flight.

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Hydrographic Data from the **OPTOMA** *Program:*

OPTOMA11

5 June - 5 August, 1984

by

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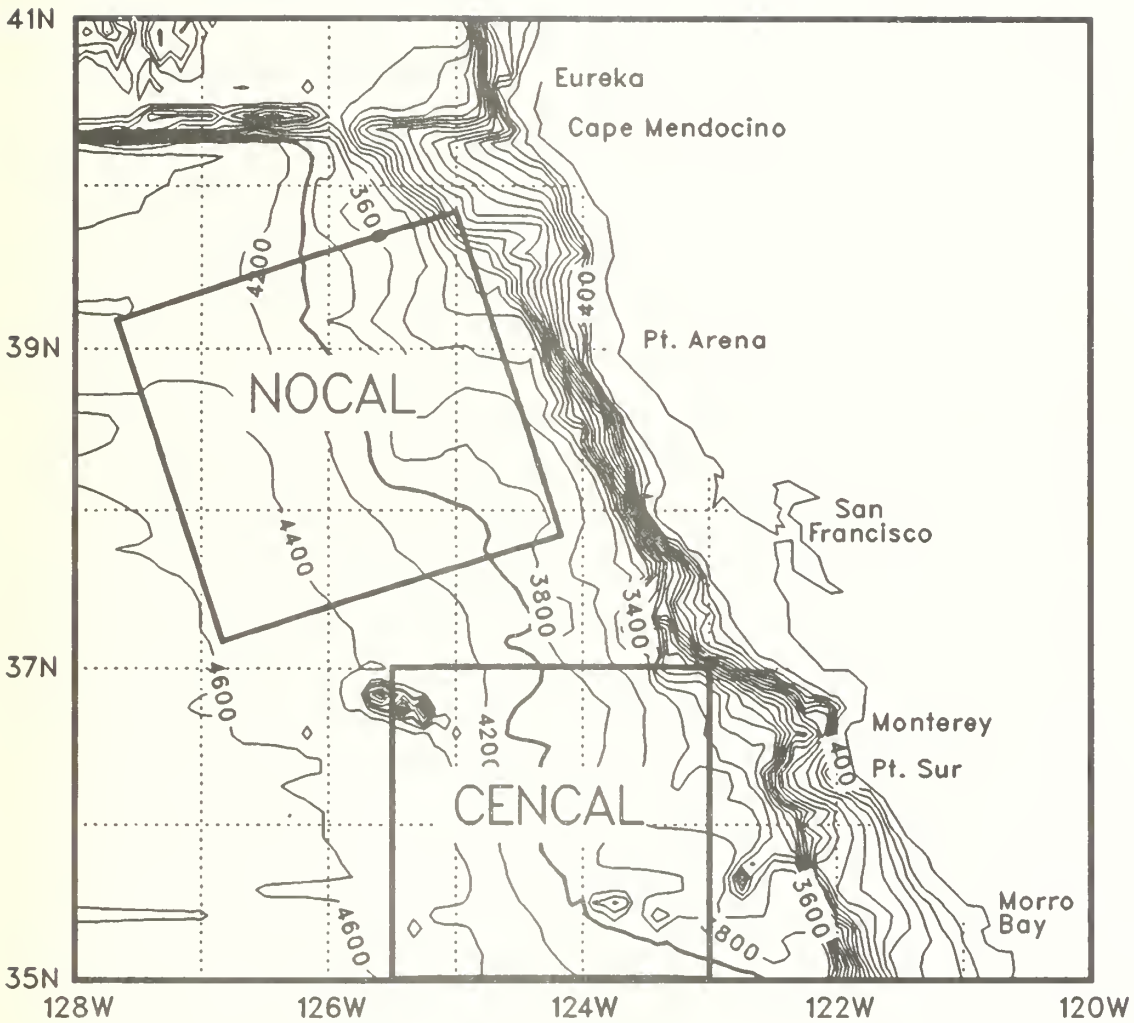


Figure 1: The NOCAL and CENCAL subdomains of the OPTOMA Program. Isobaths are shown in meters.

INTRODUCTION

The OPTOMA (Ocean Prediction Through Observations, Modeling and Analysis) Program, a joint NPS/Harvard program sponsored by ONR, seeks to understand the mesoscale (fronts, eddies, and jets) variability and dynamics of the California Current System and to determine the scientific limits to practical mesoscale ocean forecasting. To help carry out the aims of this project, a series of cruises has been planned in two subdomains, NOCAL and CENCAL, shown in Figure 1.

The six cruises and one AXBT flight comprising OPTOMA11 were undertaken, during June, July, and August 1984, in the R/V ACANIA (Legs AI, AII, AIII), the USNS DE STEIGUER (Legs DI, DII, DIII) and a Reserve Patrol Wing P3A aircraft (Leg P). Hydrographic data were acquired off the coast of California in an area which covered and extended the NOCAL region. The sampling was concentrated in a central 150km square domain centered about 190km off the coast between Pt. Reyes and Pt. Arena in the NOCAL domain.

Leg AI was carried out from 5 to 15 June, Leg AII from 21 June to 30 June and Leg AIII from 5 to 13 July. These three legs sampled the central domain with additional transects to and from the domain, as shown in Figures 2, 13, and 24, respectively.

Leg DI was carried out from 23 to 30 June, Leg DII from 30 June to 10 July, and DIII from 27 July to 5 August. Leg DI sampled areas to the north, south and inshore of the central domain, as shown in Figure 31. Leg DII sampled the central domain area with additional legs to the west and south of the area, as shown in Figure 43. Leg DIII, with an intensive sampling pattern which differed from the previous cruises, covered the central and inshore domains, as shown in Figure 56.

Leg P was carried out on 18 July aboard a USNR P3A aircraft, and sampled an area approximately 250km square in the NOCAL area, as shown in Figure 68.

On each cruise track, transect extremes are identified by letter to aid in cross-referencing the data presented in subsequent figures. On each of these cruises, hydrographic stations were occupied at approximately 15 km along the track. For the AXBT flight, the along-track station spacing was about 35 km.

DATA ACQUISITION

Data acquired during OPTOMA11 Legs AI, AII, AIII, DI, DII, and DIII include XBT and CTD profiles. Bucket surface temperature and water samples for salinity were taken at every CTD station. These surface values were used for calibration purposes as well as contributions to the data base. Legs AI, AII, and AIII also acquired continuous 2 m thermosalinograph measurements, continuous meteorological data such as atmospheric pressure at a height of 2 m and wind speed and direction at a height of 20 m, and intermittent acoustic Doppler velocity data. The XBT data were digitized using a Sippican MK9 unit. The continuous "underway" data were digitized using an HP 5328 frequency counter and a 40 channel digital voltmeter. The continuous data were averaged over two-minute intervals. All data were recorded, using an HP 200 series computer, on data disks and transferred ashore to the IBM 3033 mainframe computer for editing and processing.

Station positions were determined by Loran C fixes and are claimed to be accurate to within about 0.1 km. Table 1 on page 6 summarizes the various sensors available on the R/V ACANIA and their accuracy. A Neil Brown CTD and Sippican XBT's were also used on the USNS DE STEIGUER; their accuracies are the same as stated in Table 1. The bottle surface salinity samples were determined by a Guildline Model 8400 "Autosal" salinometer with an accuracy of $\pm$0.003ppt. Samples from Legs DI, DII, and DIII were determined onboard; samples from Legs

AI, AII, and AIII were determined ashore.

During Leg P, when shallow (305m) Sippican AXBT's were deployed, the aircraft maintained an altitude of approximately 1500 ft and an airspeed of 210 knots. The data were recorded on audio tapes. Station positions are accurate to within 1 km, temperature values to within 0.2°C and depth values to within 2% or 5 m (whichever is larger).

DATA PROCESSING

The processing of the AXBT data was carried out in Mr. Meredith Sessions' laboratory at Scripps using his audio-to-digital signal conversion system. The data were stored on magnetic tape and transferred to the IBM 3033 at the Naval Postgraduate School where obvious noise spikes were edited from the profiles.

The processing of cruise data, such as estimating depth profiles for the XBT temperature profiles based on the XBT's descent speed, and conversion of CTD conductivity to salinity using the algorithm given in Lewis and Perkin (1981), was carried out on the IBM 3033. The data were then edited by removing obvious salinity spikes and eliminating cast failures that were not identified during the cruise. Approximately 96%, 97%, 100%, 97%, 99%, 99%, and 87%, of casts were retained in the data set of Legs AI, AII, AIII, DI, DII, DIII, and P, respectively. From a comparison of the CTD surface salinities with the surface salinities from the bottle samples it was determined that no correction to the CTD salinities was needed. The CTD data were interpolated to 5 m intervals and then up and down casts were averaged.

The data have been transferred on digital tape to the National Oceanographic Data Center in Washington, DC.

DATA PRESENTATION

The cruise track, station locations (with XBT's, CTD's and AXBT's identified) and station numbers are shown in the first three figures of each of

the next seven sections, which present the data from Legs AI, AII, AIII, DI, DII, DIII and P respectively. These figures are followed by a listing of the stations, with their coordinates, the date and time at which the station was occupied, and the surface information obtained at the station.

Vertical profiles of temperature from the XBT casts are shown in staggered fashion. The location of these profiles may be found by reference to the various maps of the cruise tracks. Transect extremes are identified as nearly as possible. The first profile on each plot is shown with its temperature unchanged; to each subsequent profile an appropriate multiple of 5C has been added. Vertical profiles from the CTD's follow (except Leg P). Profiles of temperature are staggered by 5C and those of salinity by 4 ppt.

Isotherms for each transect are shown in the next pages, followed by isopleths of temperature, salinity and sigma-t, from the CTD's, when four or more casts were acquired along a transect. Based on instrument accuracy and the vertical temperature gradient, it is estimated that depths of isotherms in the main thermocline are uncertain to $\pm$20m. The tick marks identify station positions and, again, the transect extremes are shown on these plots.

Each section includes mean profiles of temperature from the XBT's. In addition, for all sections except 3 and 7, mean profiles of temperature, salinity and sigma-t from the CTD's are given, as well as a scatter diagram of the T-S pairs and the mean S(T) curve, with the $\pm$ standard deviation envelope; the data presentation concludes with a plot of the mean N^2 (Brunt-Vaisala frequency squared) profile, with $\pm$ the standard deviation. On the sigma-t and N^2 plots, the appropriate profiles derived from the mean temperature and mean salinity profiles are also shown.

Table 1: Scientific instruments aboard the R/V ACANIA

	Instrument	Variable	Sensor	Accuracy	Resolution
	Neil Brown CTD Mark IIIb	pressure temperature conductivity	strain gage thermistor electrode cell	1.6 db 0.005 C 0.005 mmho	0.025 db 0.0005 C 0.001 mmho
	Sippican BT	temperature depth	thermistor descent speed	0.2 C greater of 4.6 m and 2% of depth	
*	Guildline Autosal	conductivity	electrode cell	0.003 ppt	0.0002 ppt
+	Amatek straza ADVP	velocity profiles to 100m	4 beam sonar	3 cm/sec relative to ship speed	3 cm/sec
	Rosemount Sensor	sea surface temperature	platinum thermometer	0.05 C	0.005 C
	Sea-Bird Sensors	temperature conductivity at 2 meters	thermistor electrode cell	0.003 C 0.003 mmho	0.0005 C 0.0005 mmho
	Rosemount Sensor	air temperature	thermometer	0.01 C	
	Kavolico Barometer	atmospheric pressure	pressure transducer	1.5 mb	0.1 mb
*	1200 EPS Hygrometer	dew point	condensation temp. sensor	0.2 C	0.02 C
	Meteorology Res. Inc.	wind speed	anemometer	0.15 mph or 1%	
	Meteorology Res. Inc.	wind direction	vane	2.5 degrees	
	Internav LC408 LORAN C	position	two chain LORAN receiver	100 meters	10 meters
	Motorola Miniranger	position	microwave transponders	4 meters	2 meters

* Not operating on the OPTOMA11 cruise.

+ Intermittent

Section 1

OPTOMA11 Leg AI

5 - 15 June, 1984

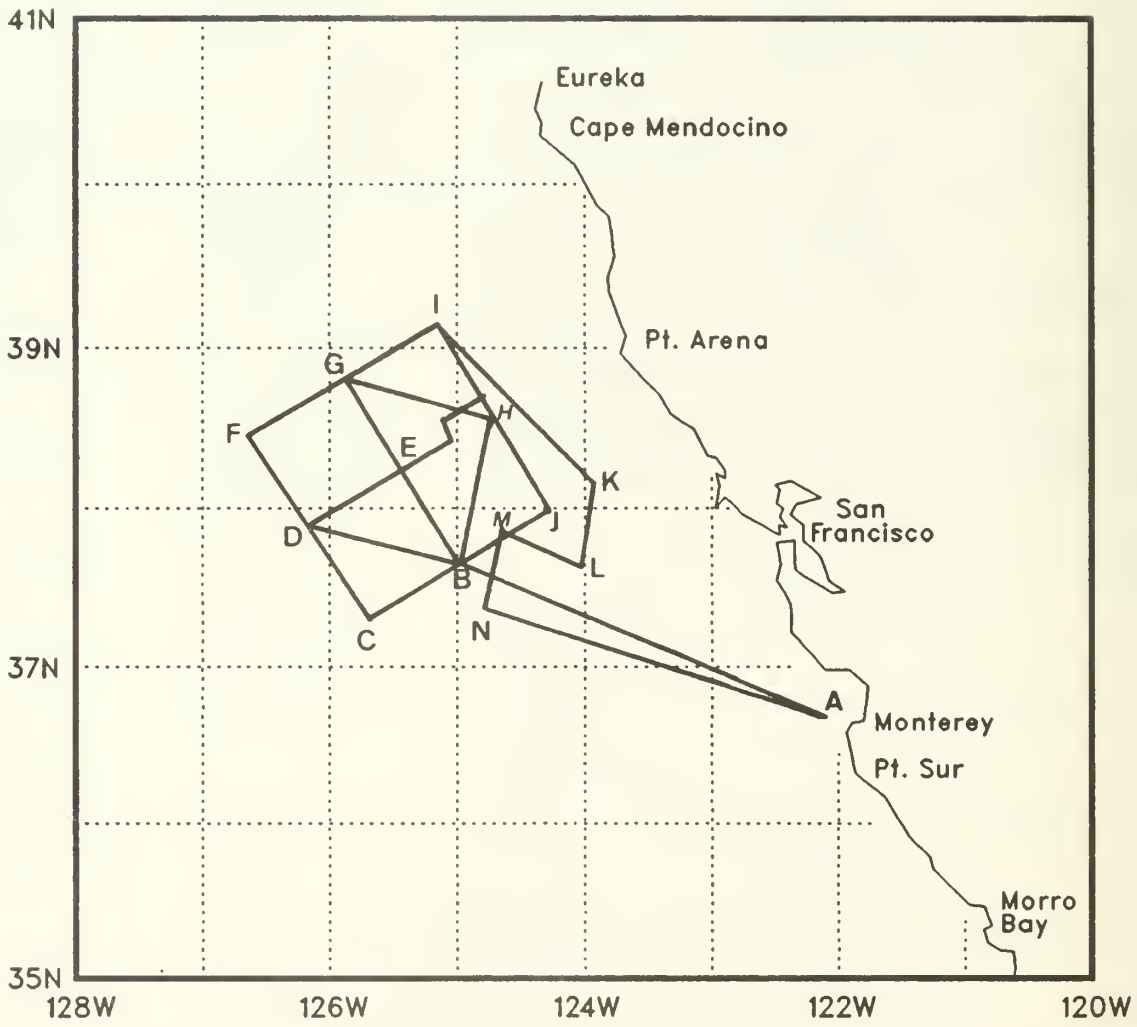


Figure 2: The cruise track for OPTOMA11, Leg AI.

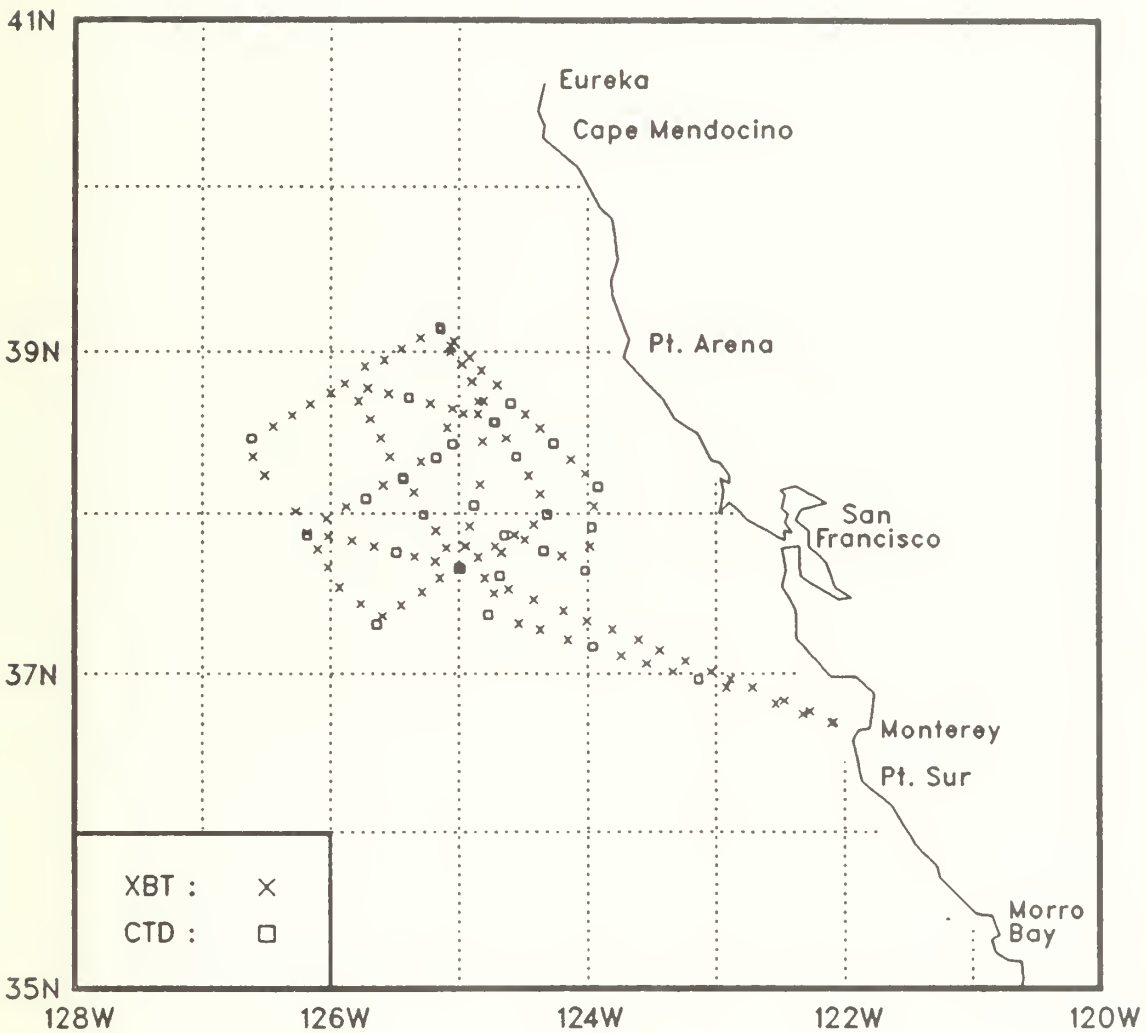


Figure 3: XBT and CTD locations for OPTOMA11, Leg AI.

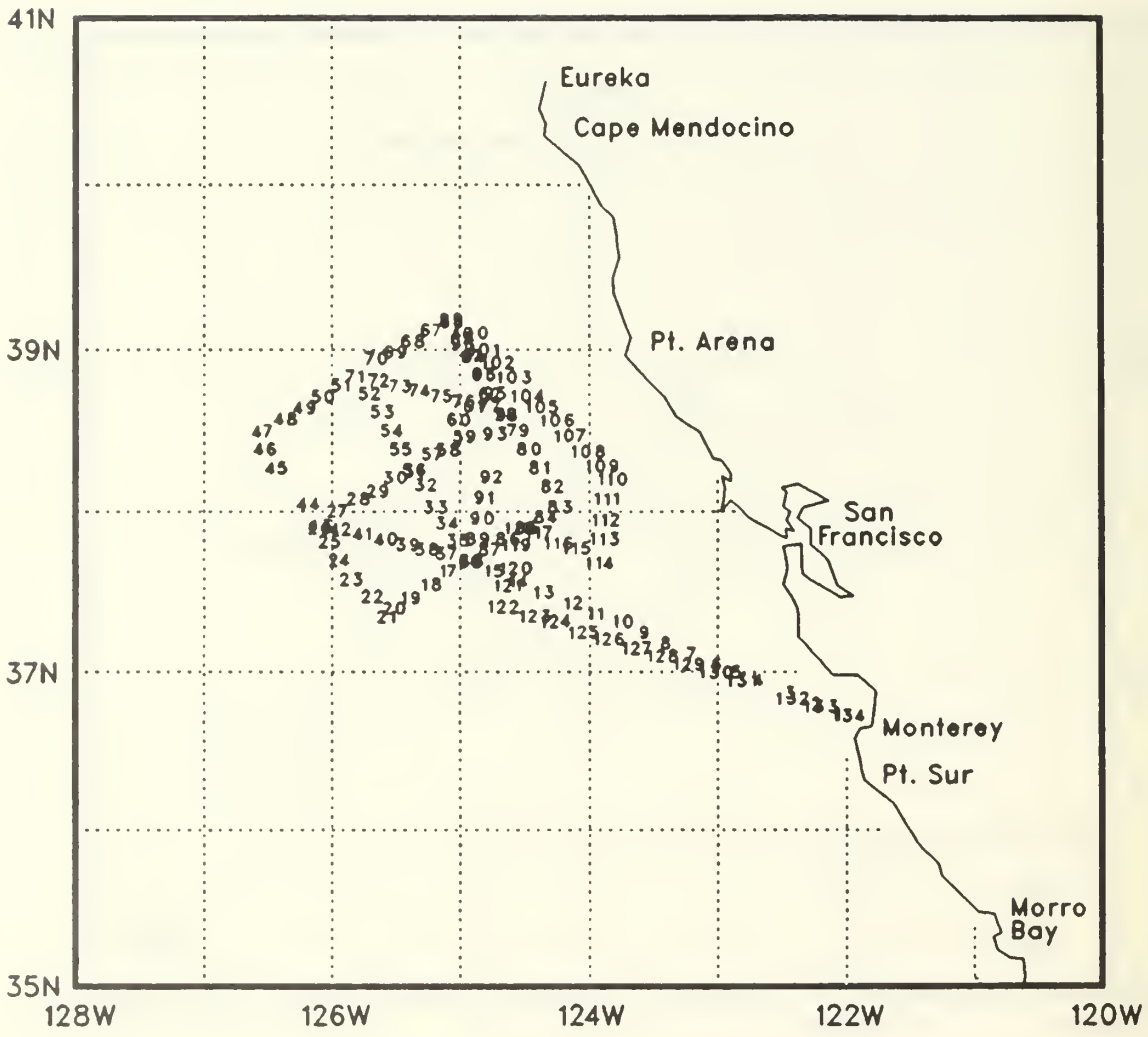


Figure 4: Station numbers for OPTOMA11, Leg AI.

Table 2: Leg AI Station Listing

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
1	XBT	84157	1755	36.42	122.05	11.8			
2	XBT	84157	1910	36.46	122.16	11.5			
3	XBT	84157	2025	36.50	122.28	11.7			
4	XBT	84157	2141	36.55	122.43	12.2			
5	XBT	84157	2255	36.58	122.53	11.9			
6	XBT	84157	2357	37.01	123.02	12.7			
7	XBT	84158	105	37.05	123.14	12.2			
8	XBT	84158	220	37.09	123.26	13.1			
9	XBT	84158	320	37.13	123.36	12.1			
10	XBT	84158	430	37.17	123.48	12.5			
11	XBT	84158	540	37.20	124.00	12.5			
12	XBT	84158	650	37.24	124.11	11.9			
13	XBT	84158	818	37.28	124.25	12.2			
14	XBT	84158	940	37.32	124.37	11.7			
15	XBT	84158	1111	37.36	124.48	11.8			
16	CTD	84158	1245	37.40	124.59	11.7	32.95	12.0	33.05
17	XBT	84158	1442	37.36	125.09	13.0			
18	XBT	84158	1555	37.31	125.18	13.8			
19	XBT	84158	1700	37.26	125.27	14.1			
20	XBT	84158	1805	37.22	125.36	14.1			
21	CTD	84158	1910	37.19	125.39	13.8	32.72	13.8	32.82
22	XBT	84158	2146	37.26	125.46	14.1			
23	XBT	84159	14	37.33	125.56	14.0			
24	XBT	84159	153	37.40	126.01	14.2			
25	XBT	84159	330	37.47	126.06	14.1			
26	CTD	84159	518	37.52	126.11	14.1	32.85	14.0	32.95
27	XBT	84159	724	37.58	126.02	14.0			
28	XBT	84159	825	38.03	125.53	14.0			
29	CTD	84159	925	38.06	125.44	13.8	32.73	13.6	32.81
30	XBT	84159	1134	38.11	125.36	13.3			
31	CTD	84159	1235	38.13	125.26	12.5	32.63	12.7	32.71
32	XBT	84159	1426	38.08	125.21	12.5			
33	CTD	84159	1515	38.00	125.17	11.6	33.27	11.7	33.29
34	XBT	84159	1730	37.54	125.11	12.1			
35	XBT	84159	1815	37.47	125.06	12.3			
36	XBT	84159	1915	37.39	125.00	12.8			
37	XBT	84159	2022	37.43	125.11	12.0			
38	XBT	84159	2136	37.44	125.21	12.4			
39	CTD	84159	2240	37.46	125.29	13.0	32.61	12.8	32.78
40	XBT	84160	120	37.48	125.40	13.8			
41	XBT	84160	225	37.50	125.50	14.1			
42	XBT	84160	335	37.52	126.01	14.2			
43	XBT	84160	457	37.53	126.11	14.1			
44	XBT	84160	635	38.01	126.16	14.2			
45	XBT	84160	950	38.14	126.31	14.1			

STN	TYPE	YR/DAY	GMT	LAT (NORTH) DD.MM	LONG (WEST) DDD.MM	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
46	XBT	84160	1115	38.21	126.36	14.0			
47	CTD	84160	1244	38.28	126.37	14.1	32.89	13.8	33.05
48	XBT	84160	1440	38.32	126.27	14.2			
49	XBT	84160	1538	38.37	126.18	13.7			
50	XBT	84160	1638	38.41	126.10	13.6			
51	XBT	84160	1738	38.45	126.00	13.6			
52	XBT	84160	1955	38.42	125.47	13.9			
53	XBT	84160	2045	38.35	125.42	13.8			
54	XBT	84160	2140	38.28	125.37	13.8			
55	XBT	84160	2228	38.21	125.33	13.0			
56	CTD	84160	2321	38.14	125.26	12.9	32.66	13.0	32.77
57	XBT	84161	140	38.19	125.18	12.9			
58	CTD	84161	310	38.21	125.11	12.3	32.56	13.0	32.62
59	CTD	84161	2120	38.26	125.03	12.8	32.50	13.0	32.61
60	XBT	84161	2330	38.32	125.06	12.9			
61	XBT	84162	330	38.37	124.58	13.0			
62	XBT	84162	644	38.42	124.51	13.1			
63	XBT	84162	1100	38.49	124.54	12.6			
64	XBT	84162	1427	38.55	124.59	13.4			
65	XBT	84162	1922	39.02	125.04	12.8			
66	CTD	84162	2320	39.08	125.09	13.6	32.60	13.6	32.67
67	XBT	84163	239	39.05	125.18	13.6			
68	XBT	84163	500	39.01	125.27	13.6			
69	XBT	84163	646	38.57	125.35	13.7			
70	XBT	84163	830	38.55	125.44	13.8			
71	XBT	84163	1020	38.48	125.53	13.7			
72	XBT	84163	1152	38.47	125.43	13.8			
73	XBT	84163	1306	38.45	125.33	13.8			
74	CTD	84163	1405	38.43	125.24	13.4	32.60	13.4	32.68
75	XBT	84163	1545	38.41	125.13	13.0			
76	XBT	84163	1655	38.39	125.03	12.8			
77	XBT	84163	1750	38.37	124.51	12.9			
78	CTD	84163	1850	38.34	124.44	13.0	32.52	13.0	32.63
79	XBT	84163	2030	38.28	124.38	13.0			
80	CTD	84163	2126	38.21	124.33	13.0	32.49	13.4	32.54
81	XBT	84163	2300	38.14	124.27	12.6			
82	XBT	84163	2355	38.07	124.22	12.4			
83	CTD	84164	42	38.00	124.19	10.8	33.05	11.4	33.10
84	XBT	84164	230	37.56	124.25	10.7			
85	XBT	84164	255	37.52	124.34	11.8			
86	XBT	84164	350	37.48	124.43	11.8			
87	XBT	84164	436	37.44	124.51	12.4			
88	CTD	84164	536	37.40	125.00	11.9	33.49	12.2	33.56
89	XBT	84164	745	37.48	124.57	12.2			
90	XBT	84164	838	37.56	124.55	11.4			

STN	TYPE	YR/DAY	GMT	LAT (NORTH) DD.MM	LONG (WEST) DDD.MM	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
91	CTD	84164	935	38.03	124.53	10.9	33.08	99.9	33.27
92	XBT	84164	1122	38.11	124.50	12.9			
93	XBT	84164	1503	38.27	124.49	13.2			
94	CTD	84164	1930	38.34	124.43	13.2	32.50	13.6	32.60
95	XBT	84165	148	38.42	124.49	13.3			
96	XBT	84165	635	38.49	124.54	13.4			
97	XBT	84165	1550	38.55	124.59	13.4			
98	XBT	84165	1838	39.00	125.04	13.5			
99	CTD	84165	2200	39.09	125.09	13.5	32.60	13.5	32.69
100	XBT	84165	2325	39.04	125.03	13.6			
101	XBT	84166	25	38.58	124.55	13.6			
102	XBT	84166	105	38.53	124.49	13.5			
103	XBT	84166	228	38.48	124.42	13.5			
104	CTD	84166	335	38.41	124.36	13.3	32.62	13.4	32.71
105	XBT	84166	533	38.37	124.29	13.5			
106	XBT	84166	625	38.32	124.22	13.2			
107	CTD	84166	715	38.26	124.16	12.5	32.59	99.9	32.66
108	XBT	84166	942	38.20	124.08	11.4			
109	XBT	84166	1035	38.15	124.01	11.5			
110	CTD	84166	1122	38.10	123.55	10.0	33.18	10.1	33.26
111	XBT	84166	1302	38.03	123.57	10.3			
112	CTD	84166	1356	37.55	123.58	12.2	33.50	12.3	33.59
113	XBT	84166	1535	37.48	123.59	12.4			
114	CTD	84166	1635	37.39	124.01	12.3	33.48	12.4	33.57
115	XBT	84166	1842	37.45	124.12	11.6			
116	CTD	84166	1957	37.46	124.20	12.0	33.47	12.2	33.57
117	XBT	84166	2208	37.50	124.29	12.2			
118	CTD	84166	2335	37.52	124.39	10.4	33.36	10.7	33.45
119	XBT	84167	112	37.46	124.40	11.9			
120	CTD	84167	210	37.37	124.41	11.8	33.40	12.0	33.51
121	XBT	84167	337	37.30	124.44	12.3			
122	CTD	84167	430	37.23	124.46	11.7	33.39	11.8	33.40
123	XBT	84167	630	37.19	124.32	11.9			
124	XBT	84167	745	37.17	124.22	12.0			
125	XBT	84167	850	37.13	124.09	12.0			
126	CTD	84167	1005	37.10	123.57	12.5	33.41	12.2	33.49
127	XBT	84167	1150	37.07	123.44	12.5			
128	XBT	84167	1300	37.04	123.32	12.4			
129	XBT	84167	1415	37.01	123.20	12.4			
130	CTD	84167	1528	36.58	123.08	12.5	33.57	12.6	33.65
131	XBT	84167	1707	36.55	122.55	13.0			
132	XBT	84167	1931	36.49	122.32	12.3			
133	XBT	84167	2045	36.45	122.19	12.5			
134	XBT	84167	2100	36.41	122.06	12.0			

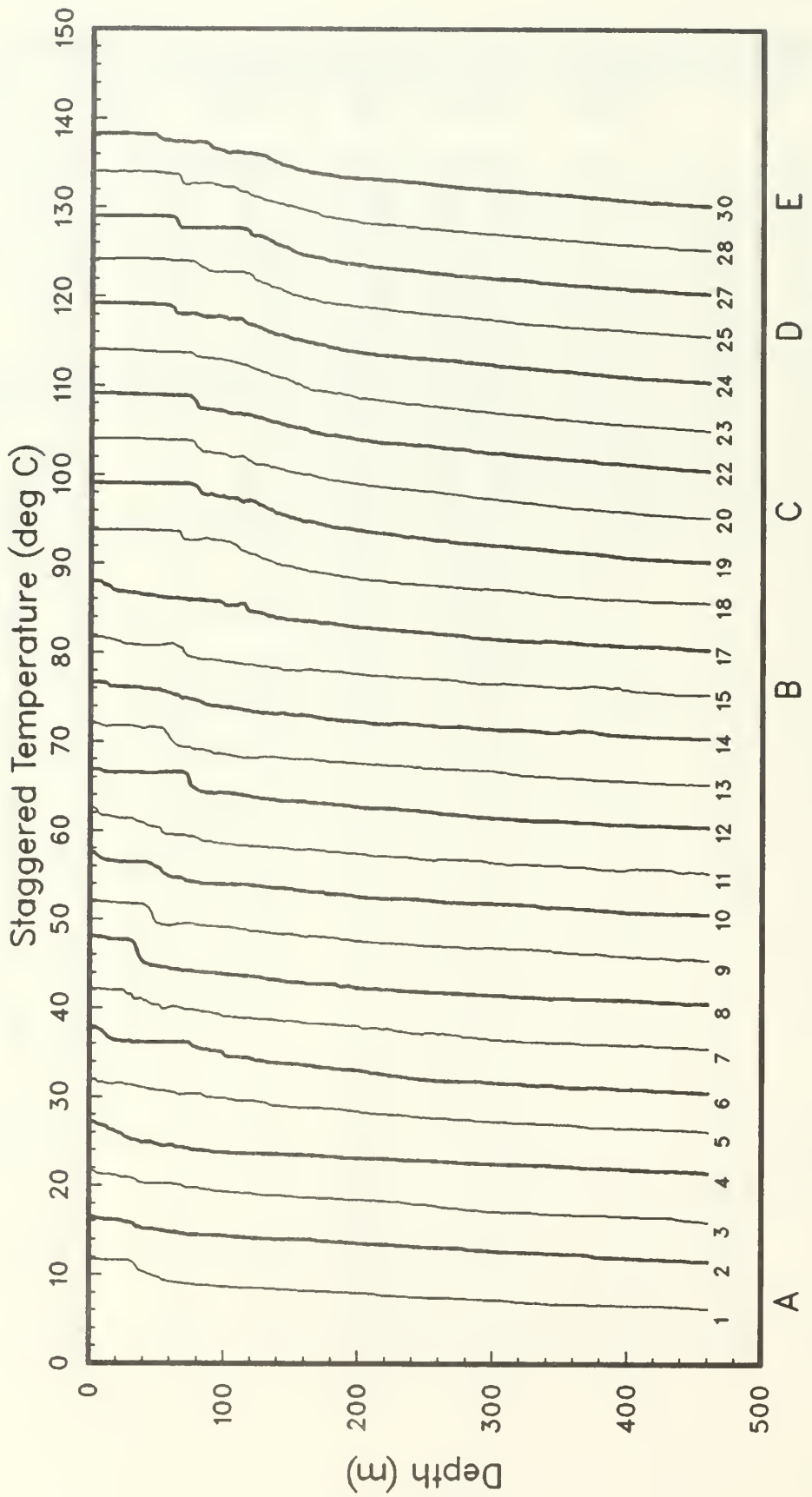
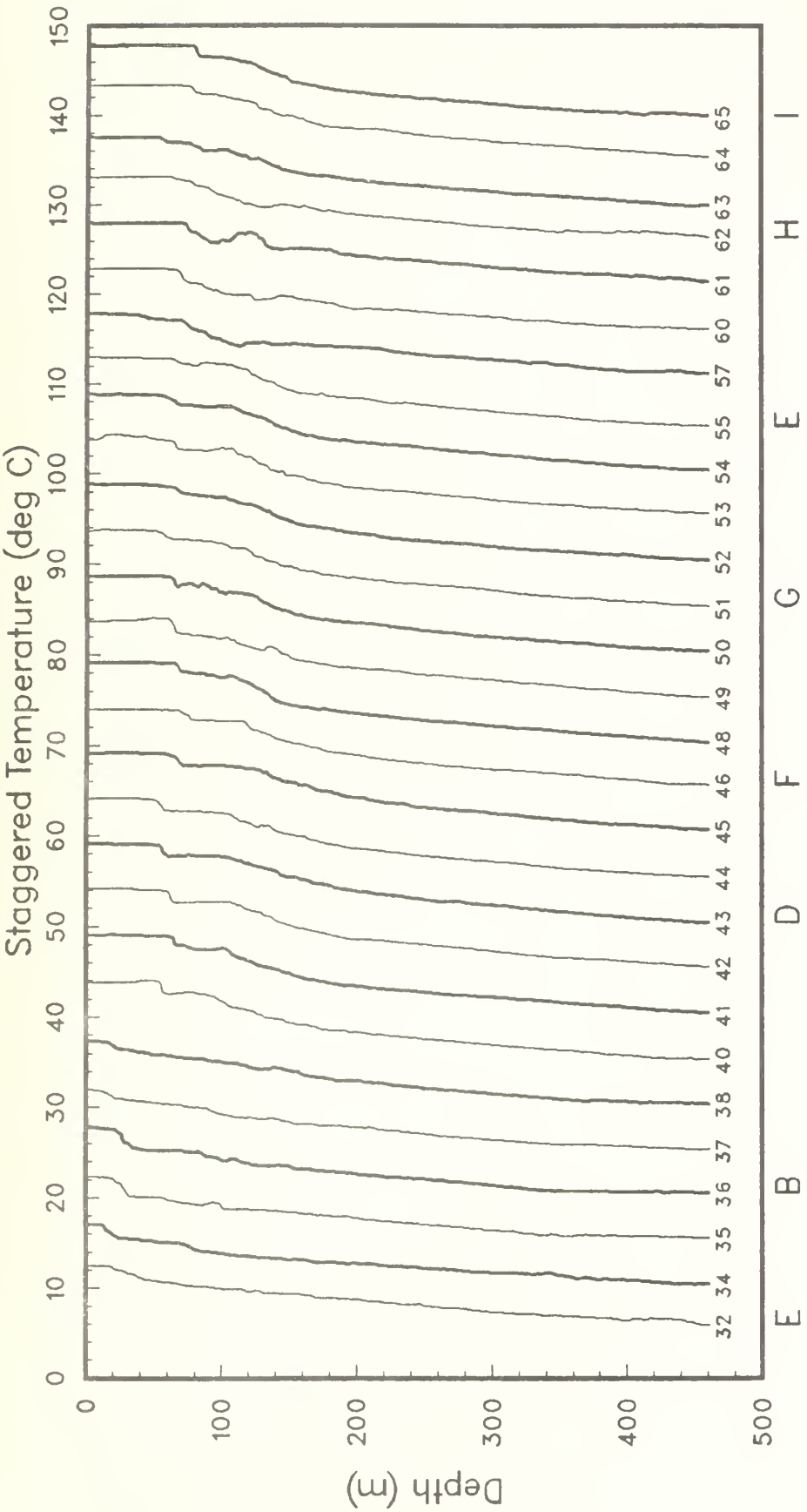


Figure 5(a): XBT temperature profiles, staggered by multiples of 5C. (OPTOMA11, Leg AI).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30
40
50
60
70
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90
100
110
120
130
140
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Depth (m)
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200
300
400
500
32 34 35 36 37 38 40 41 42 43 44 45 46 48 49 50 51 52 53 54 55 57 60 61 62 63 64 65
E
B
D
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G
E
H
I

Figure 5(b).

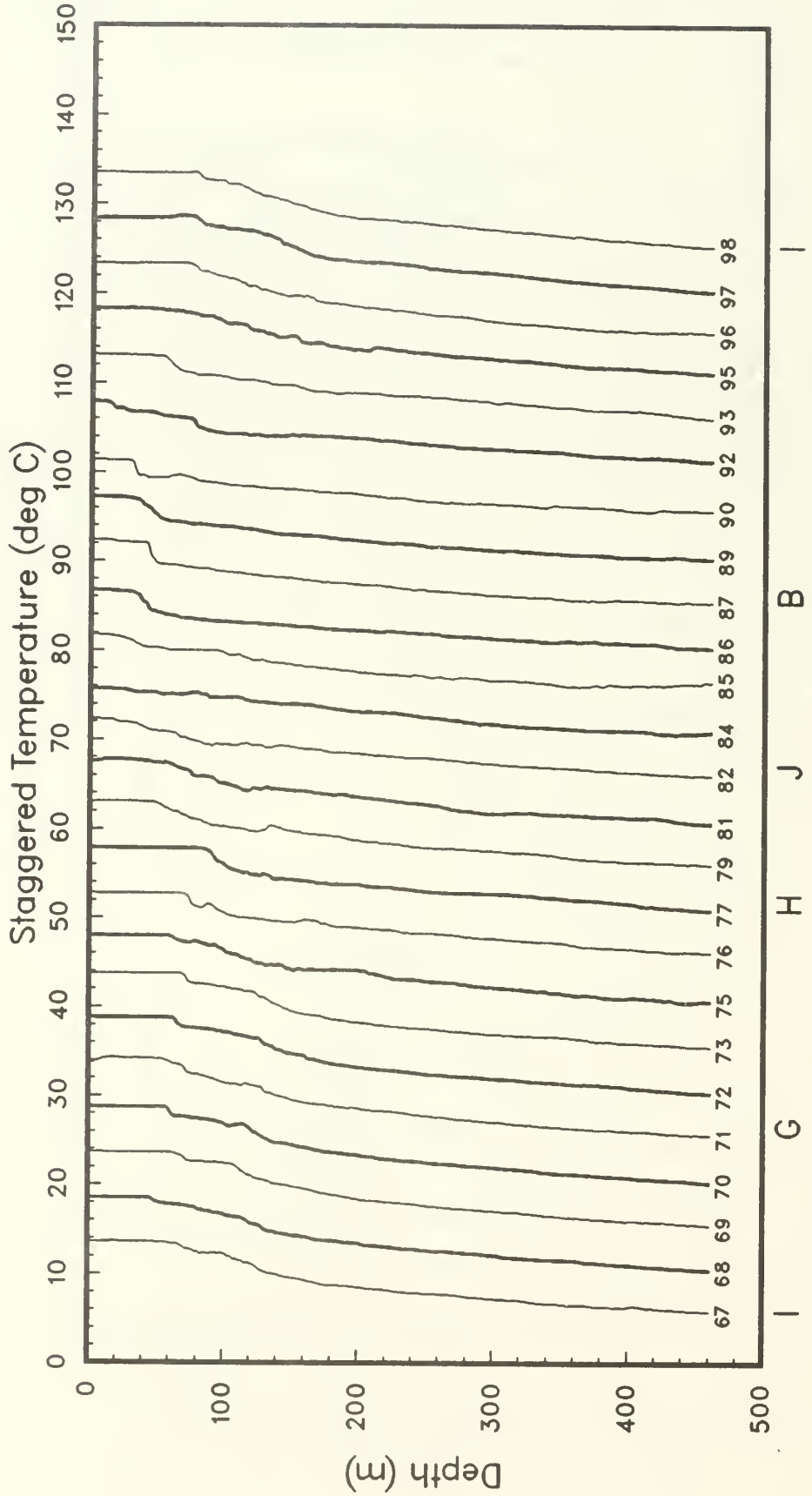
Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
Depth (m)
0
100
200
300
400
500
67
68
69
70
71
72
73
75
76
77
79
81
82
84
85
86
87
89
90
92
93
95
96
97
98
I
G
H
J
B
I

Figure 5(c).

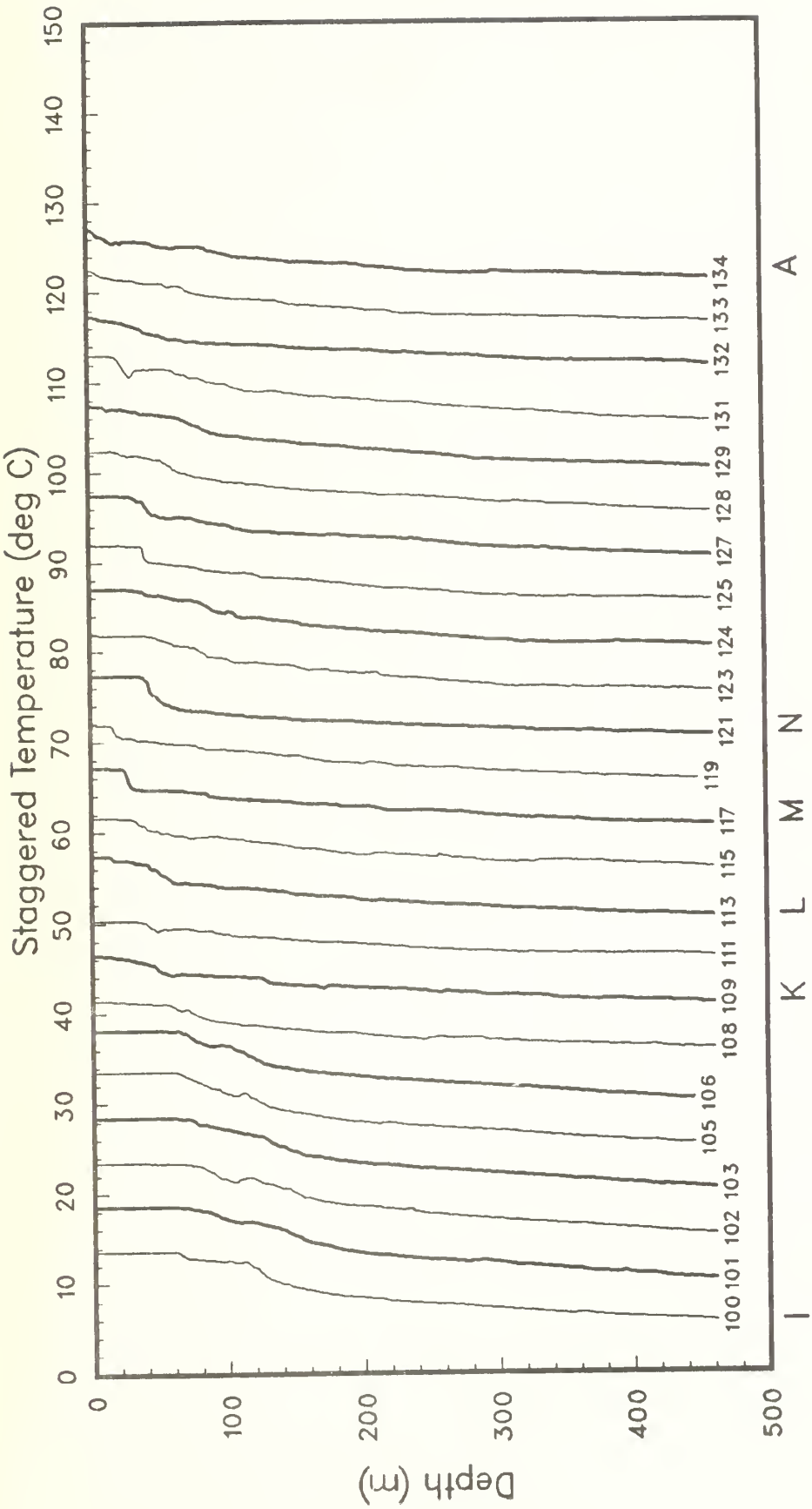
Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
Depth (m)
0
100
200
300
400
500
100 101 102 103 105 106 108 109 111 113 115 117 119 121 123 124 125 127 128 129 131 132 133 134
I
K
L
M
N
A

Figure 5(d).

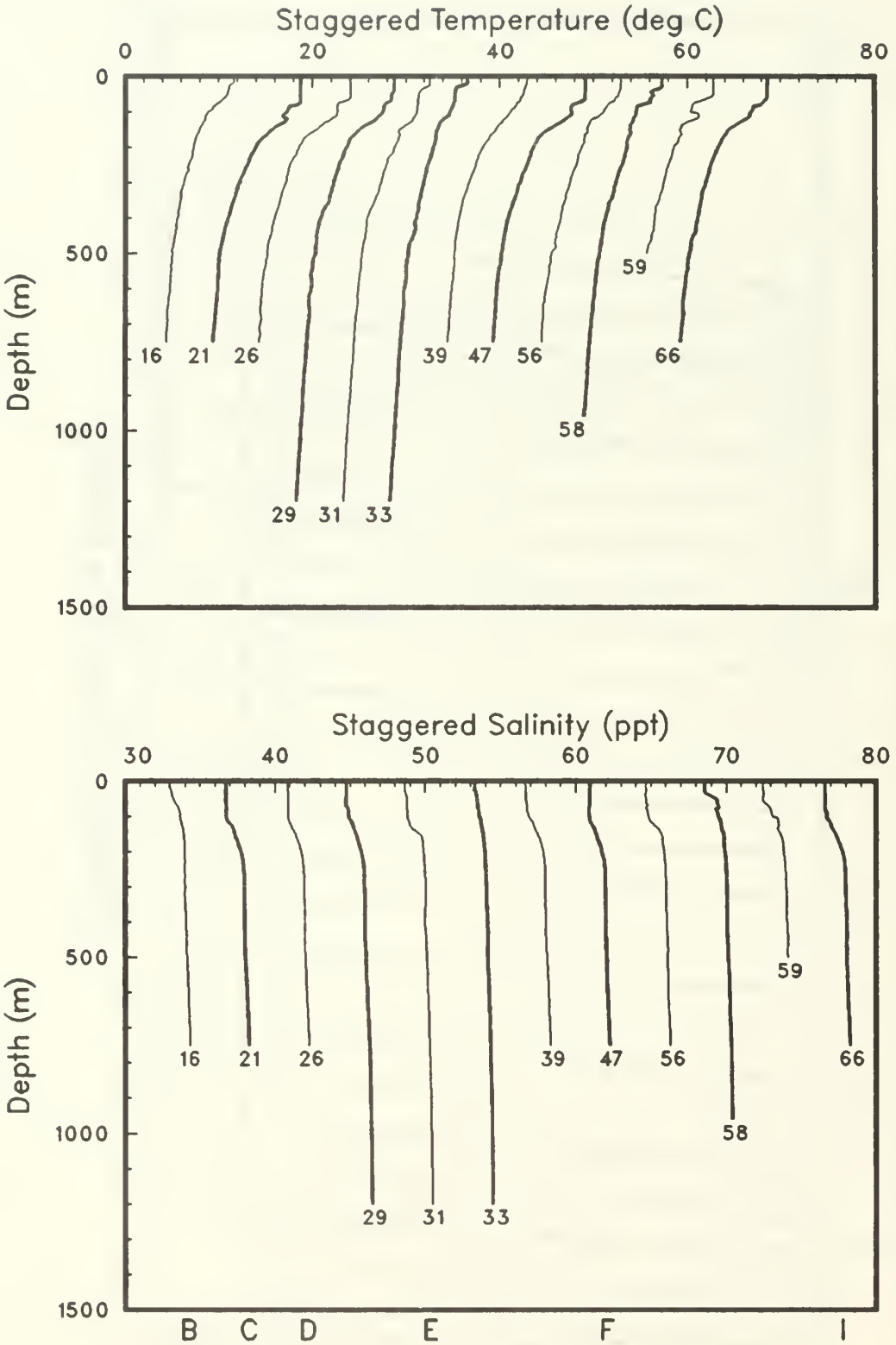

Figure 6(a): CTD temperature profiles, staggered by multiples of 5C, and salinity profiles, staggered by multiples of 4 ppt. (OPTOMA11, Leg AI).

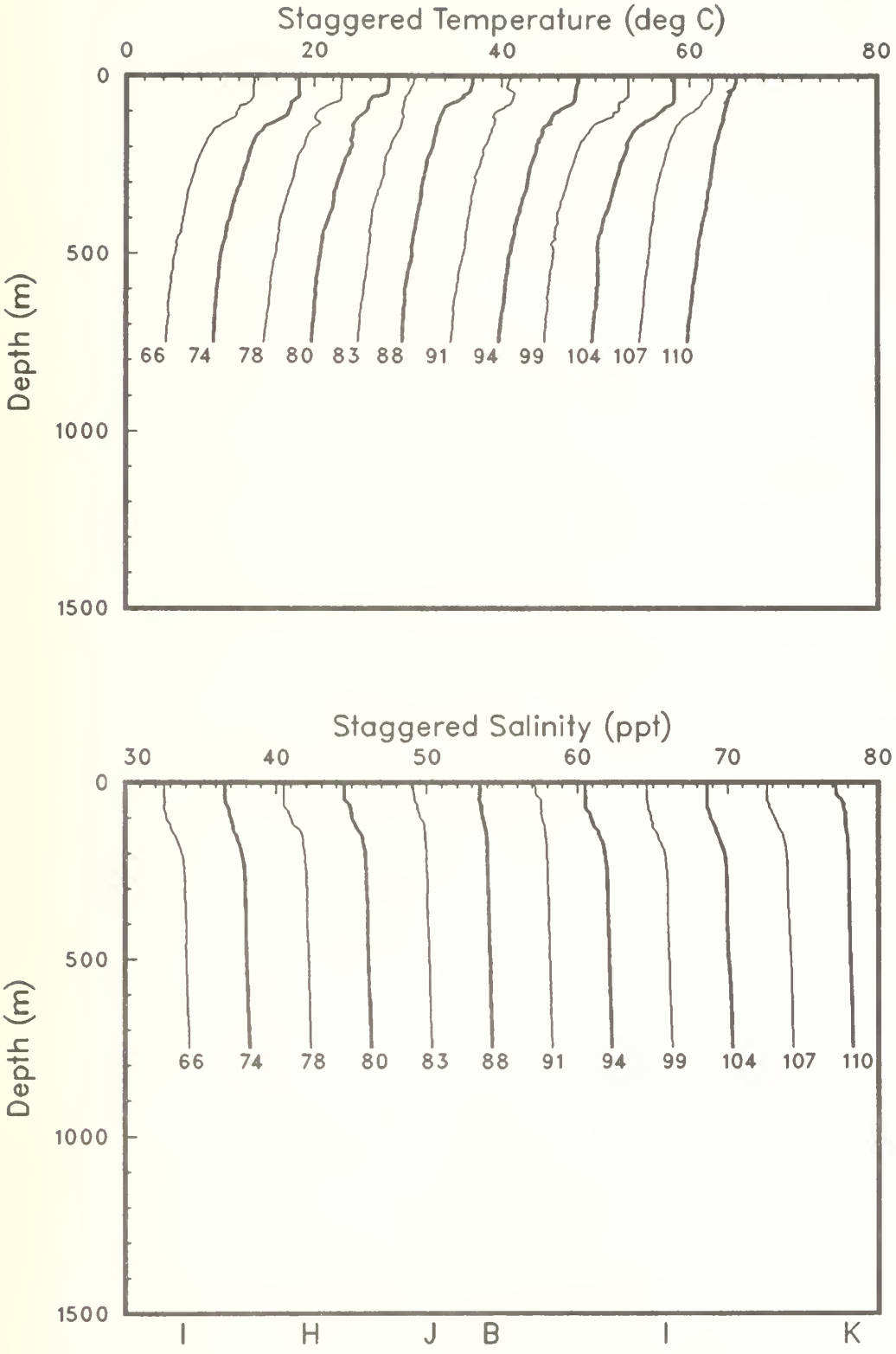
Staggered Temperature (deg C)
0
20
40
60
80
0
500
1000
1500
Depth (m)
66 74 78 80 83 88 91 94 99 104 107 110
Staggered Salinity (ppt)
30
40
50
60
70
80
0
500
1000
1500
Depth (m)
66 74 78 80 83 88 91 94 99 104 107 110
I H J B I K

Figure 6(b).

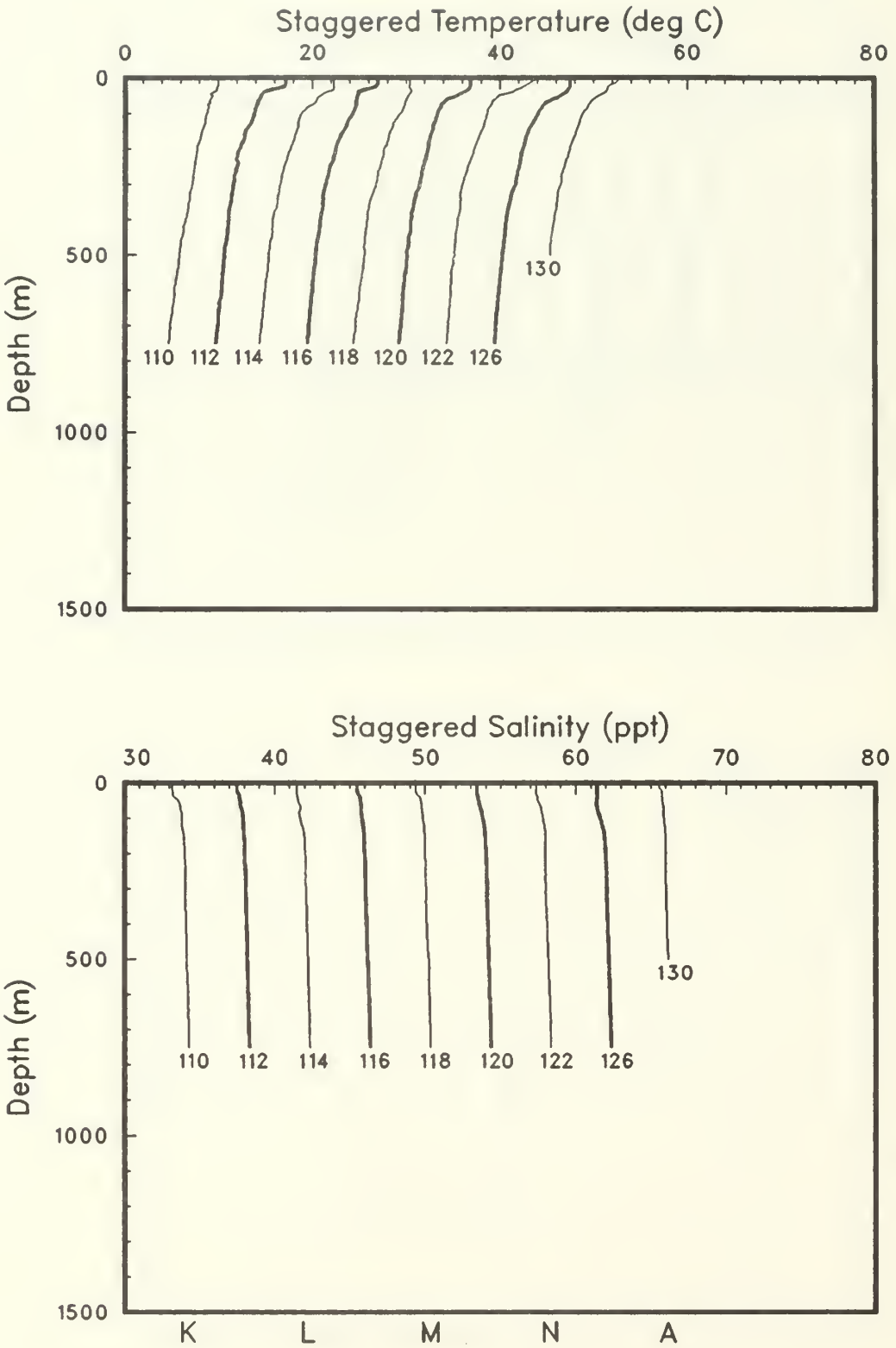
Staggered Temperature (deg C)
0
20
40
60
80
Depth (m)
0
500
1000
1500
110
112
114
116
118
120
122
126
130
Staggered Salinity (ppt)
30
40
50
60
70
80
Depth (m)
0
500
1000
1500
110
112
114
116
118
120
122
126
130
K
L
M
N
A

Figure 6(c).

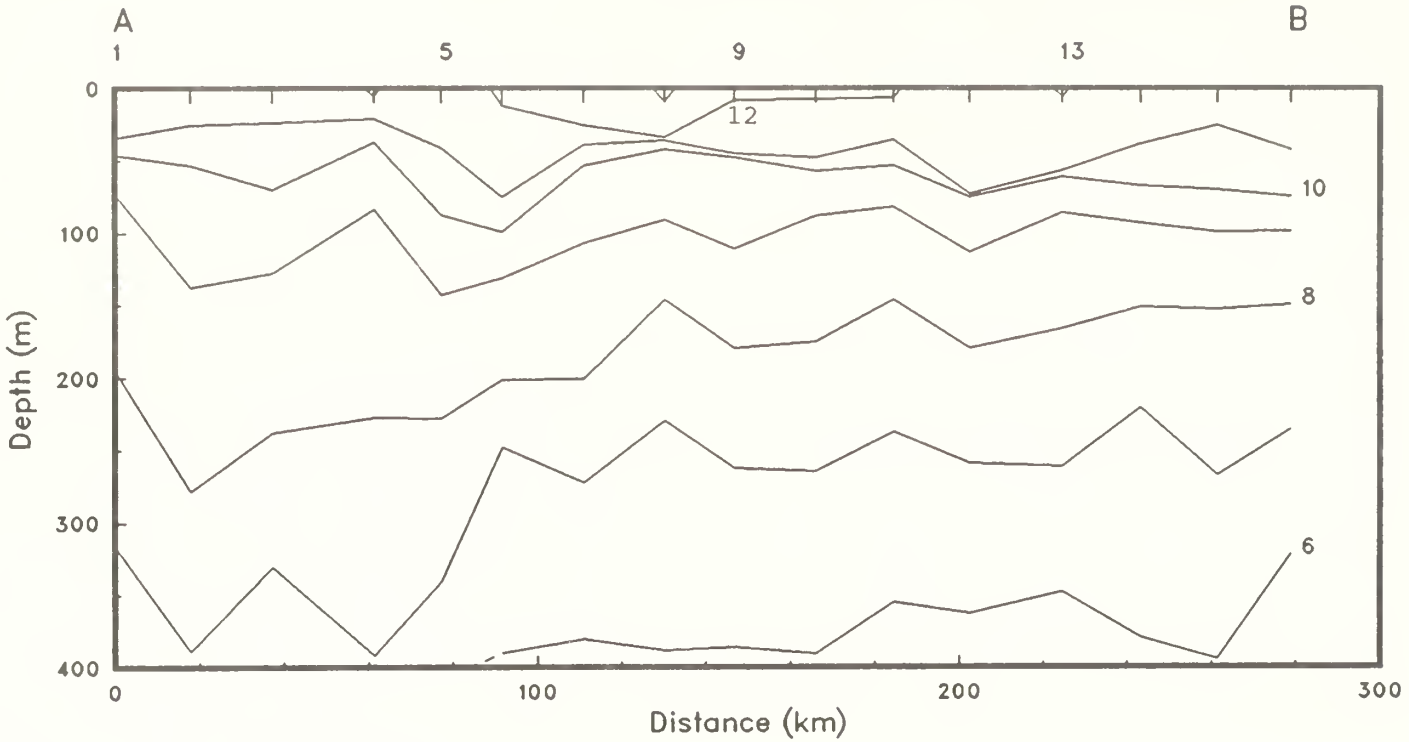

Figure 7(a): Along-track isotherms. Tick marks along the upper horizontal axis show station positions. Some station numbers are given. Dashed lines are used if the cast was too shallow. (OPTOMA11, Leg AI).

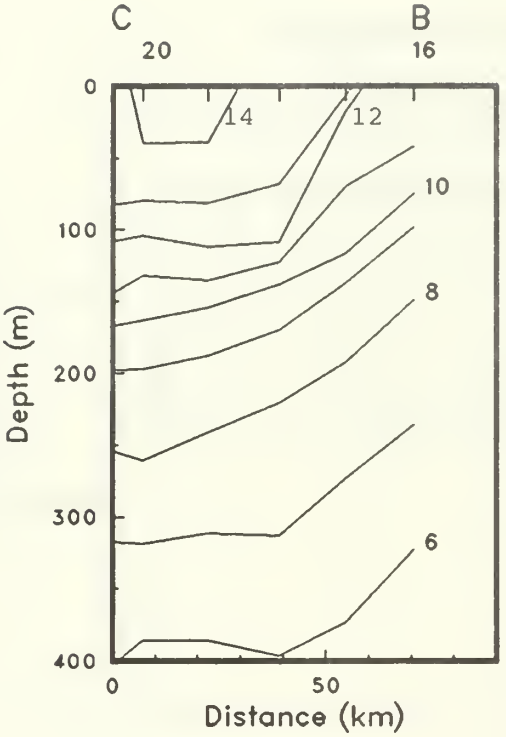

Figure 7(b).

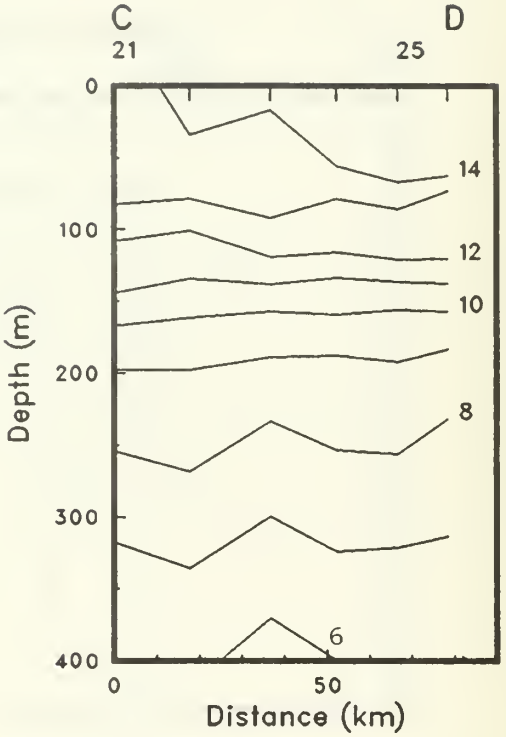

Figure 7(c).

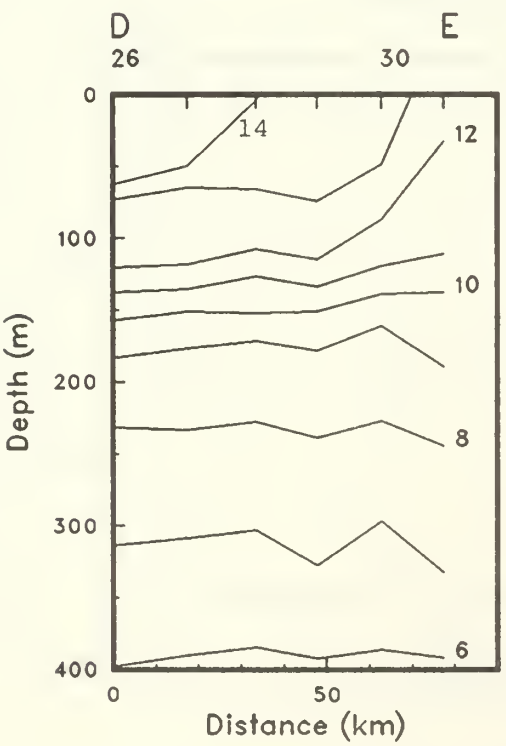

Figure 7(d).

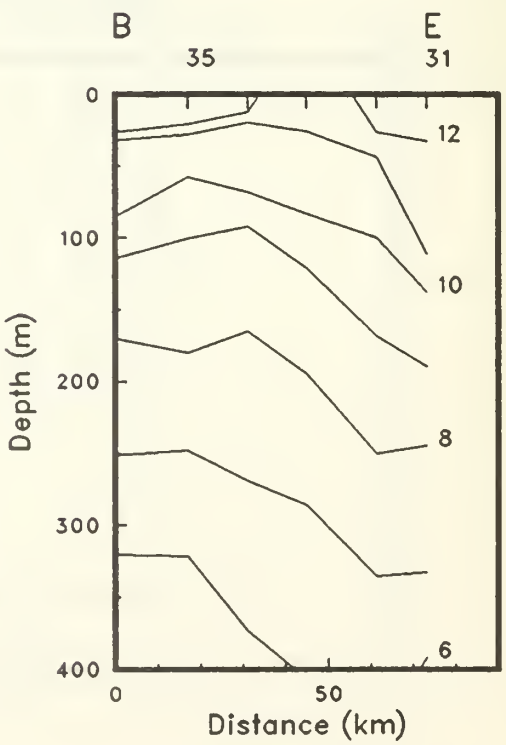

Figure 7(e).

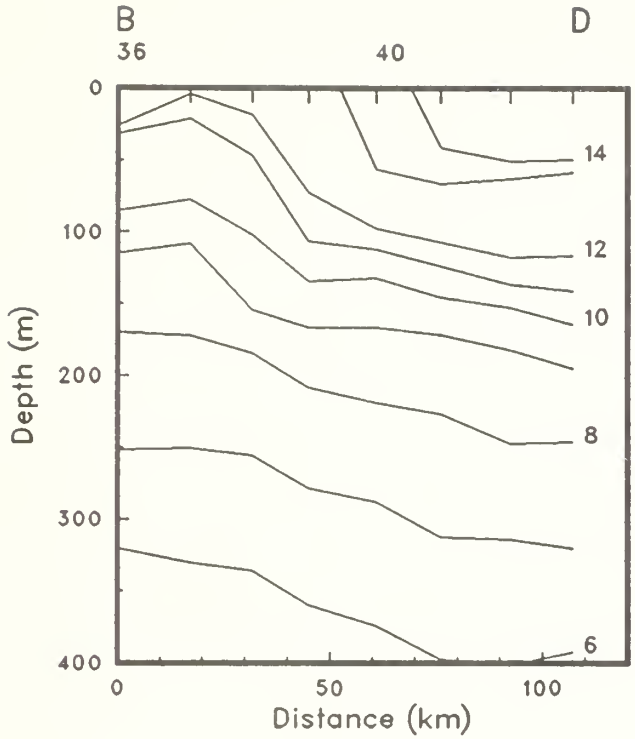

Figure 7(f).

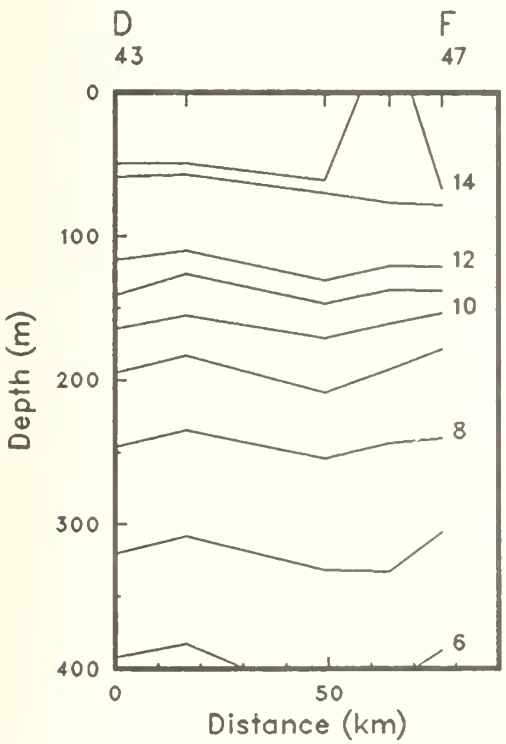

Figure 7(g).

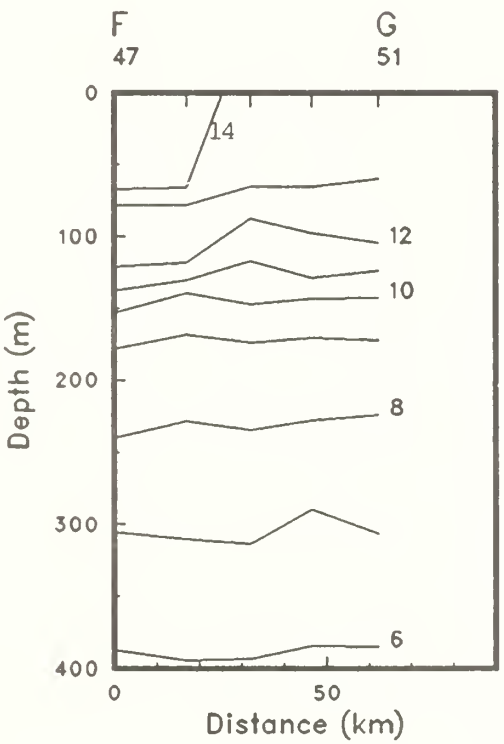

Figure 7(h).

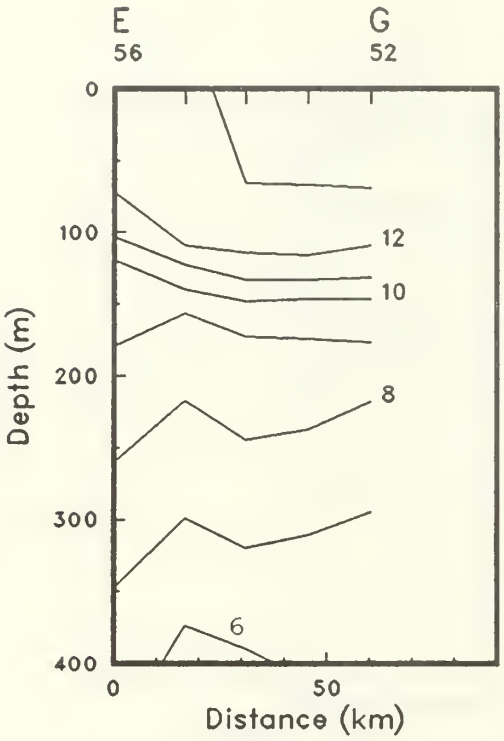

Figure 7(i).

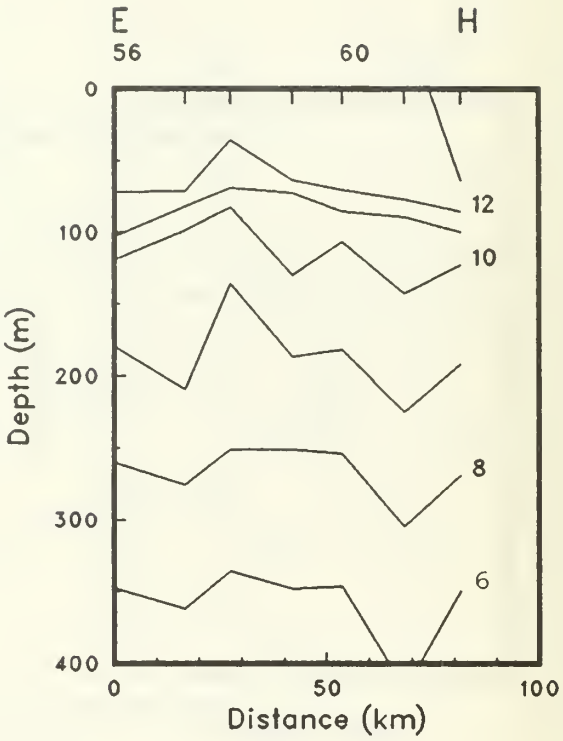

Figure 7(j).

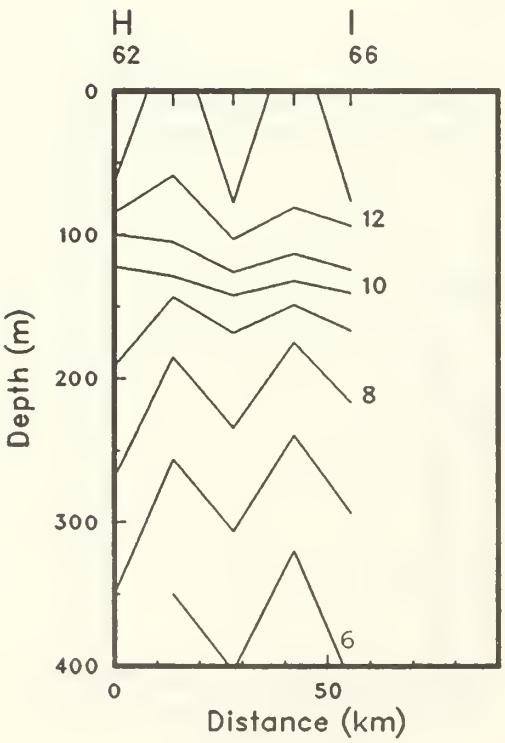

Figure 7(k).

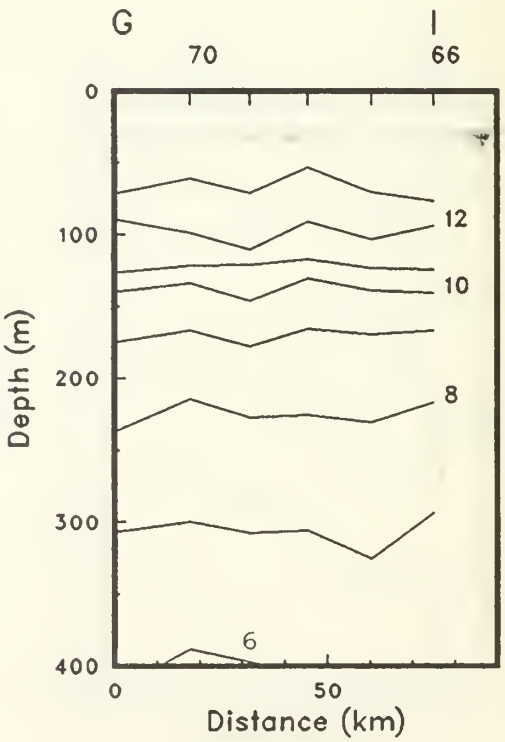

Figure 7(l).

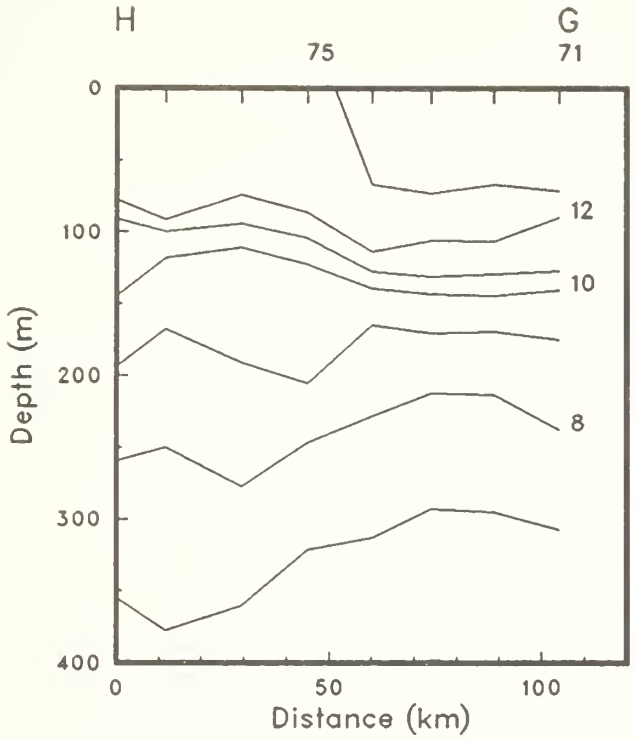

Figure 7(m).

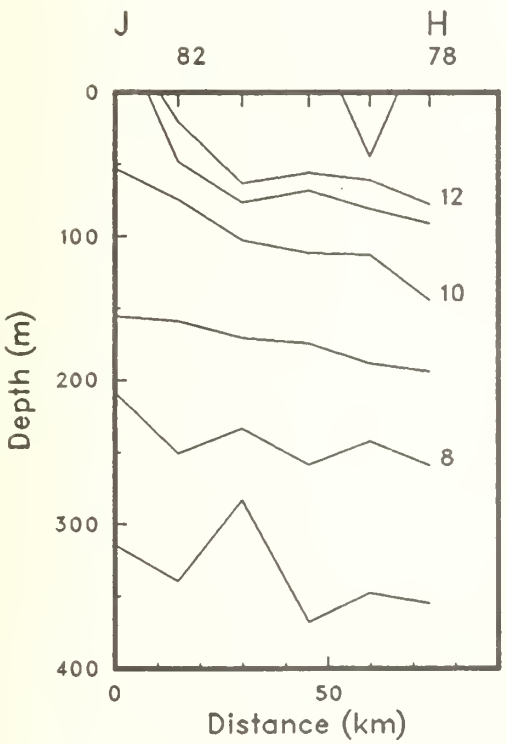

Figure 7(n).

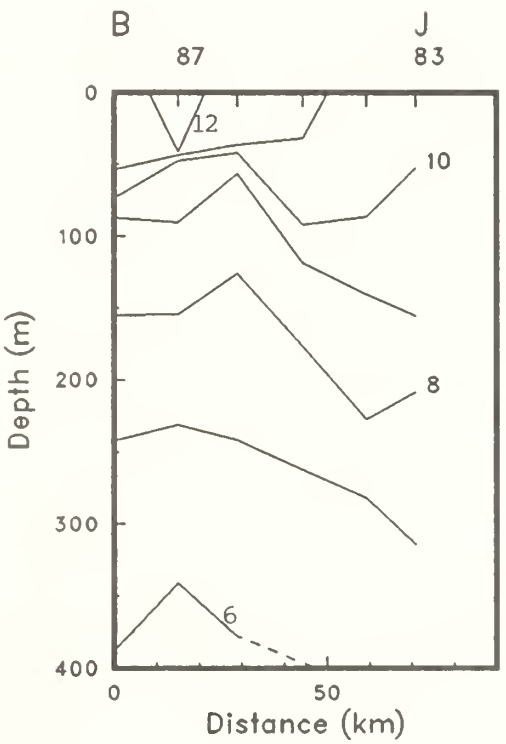

Figure 7(o).

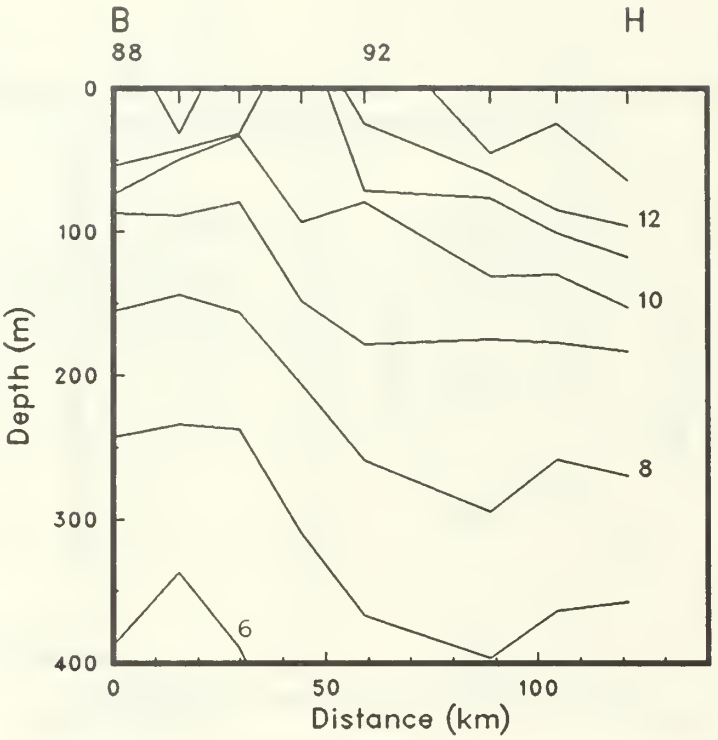

Figure 7(p).

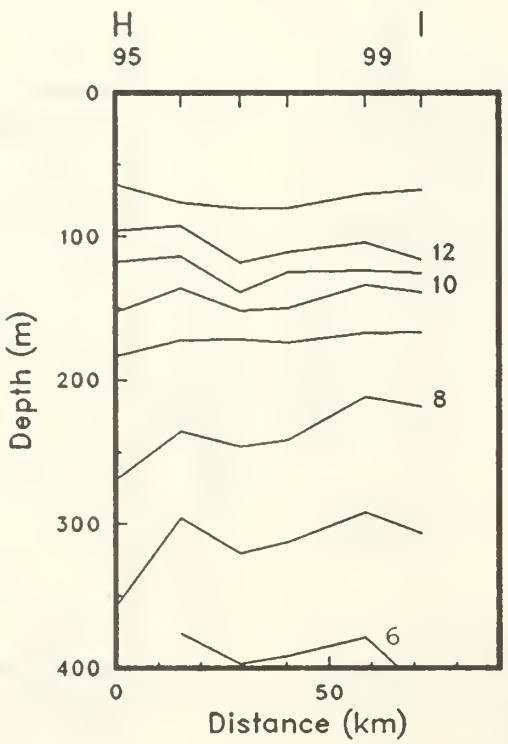

Figure 7(q).

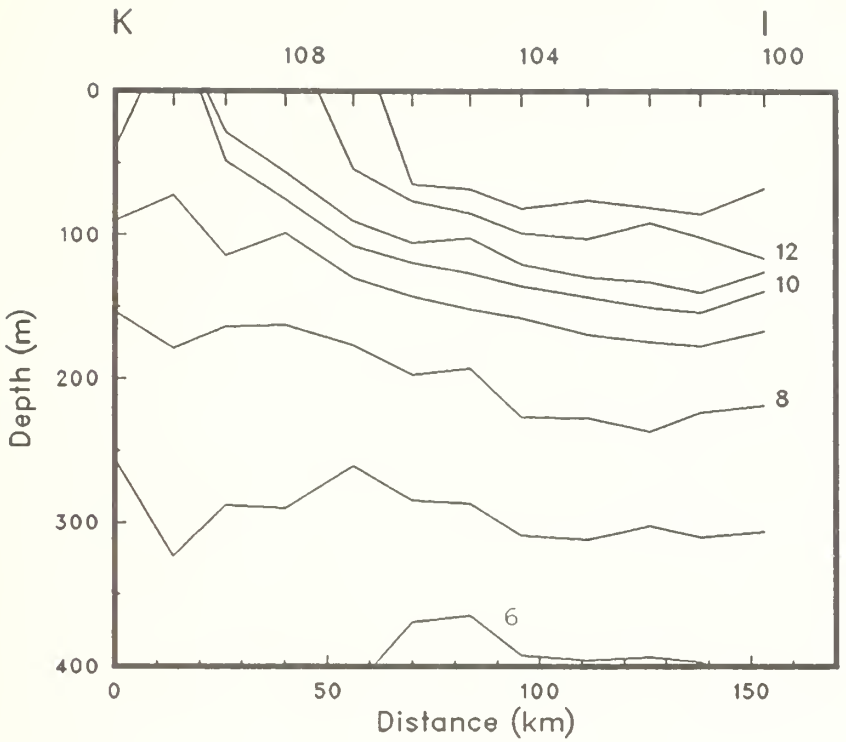

Figure 7(r).

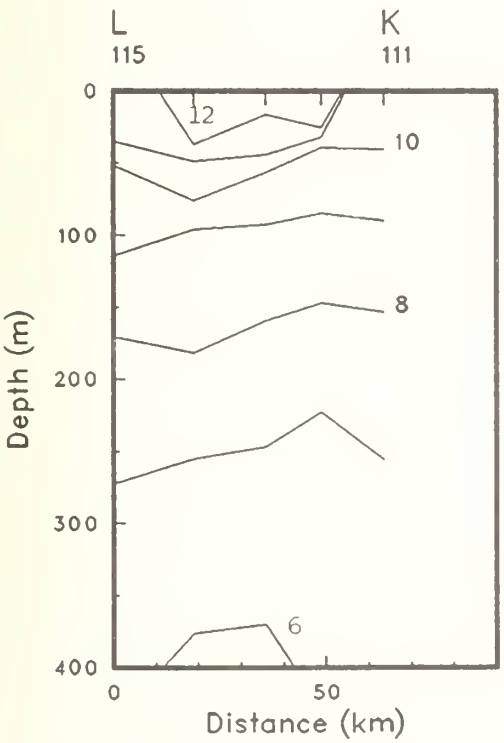

Figure 7(s).

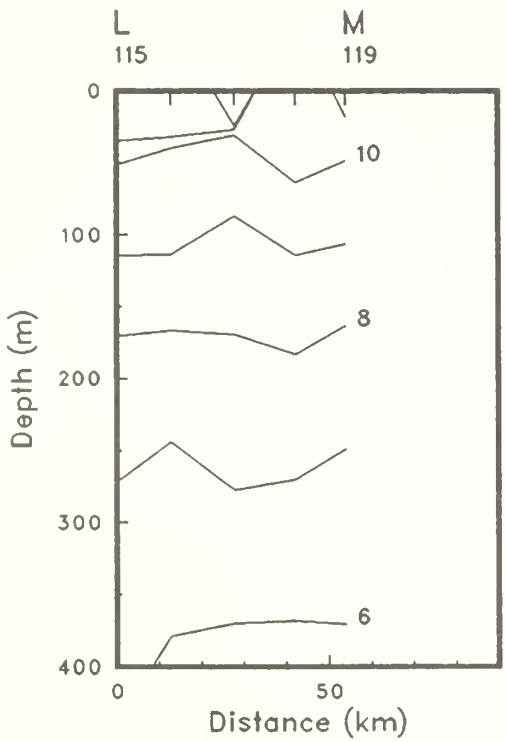

Figure 7(t).

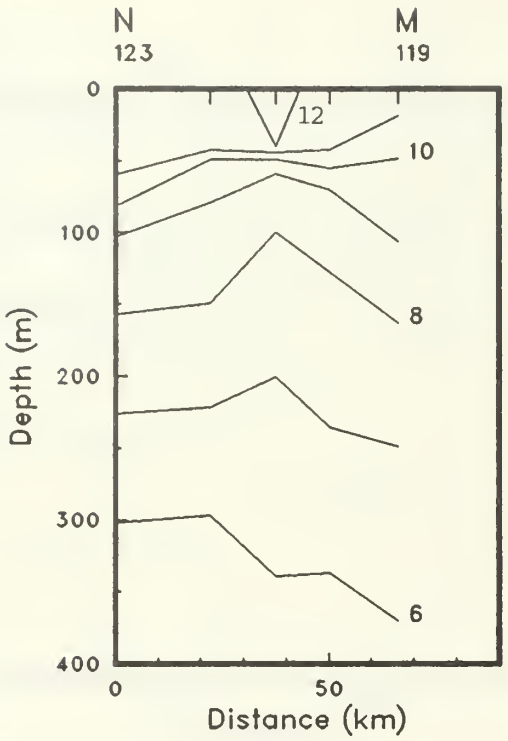

Figure 7(u).

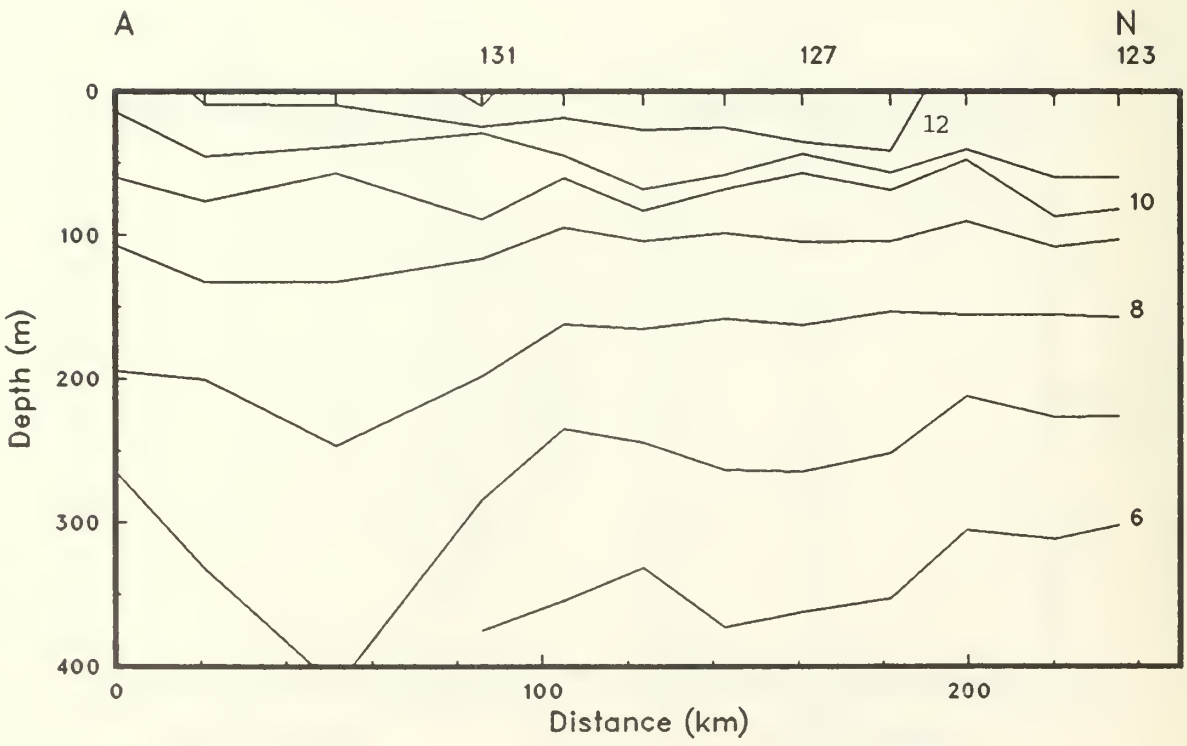

Figure 7(v).

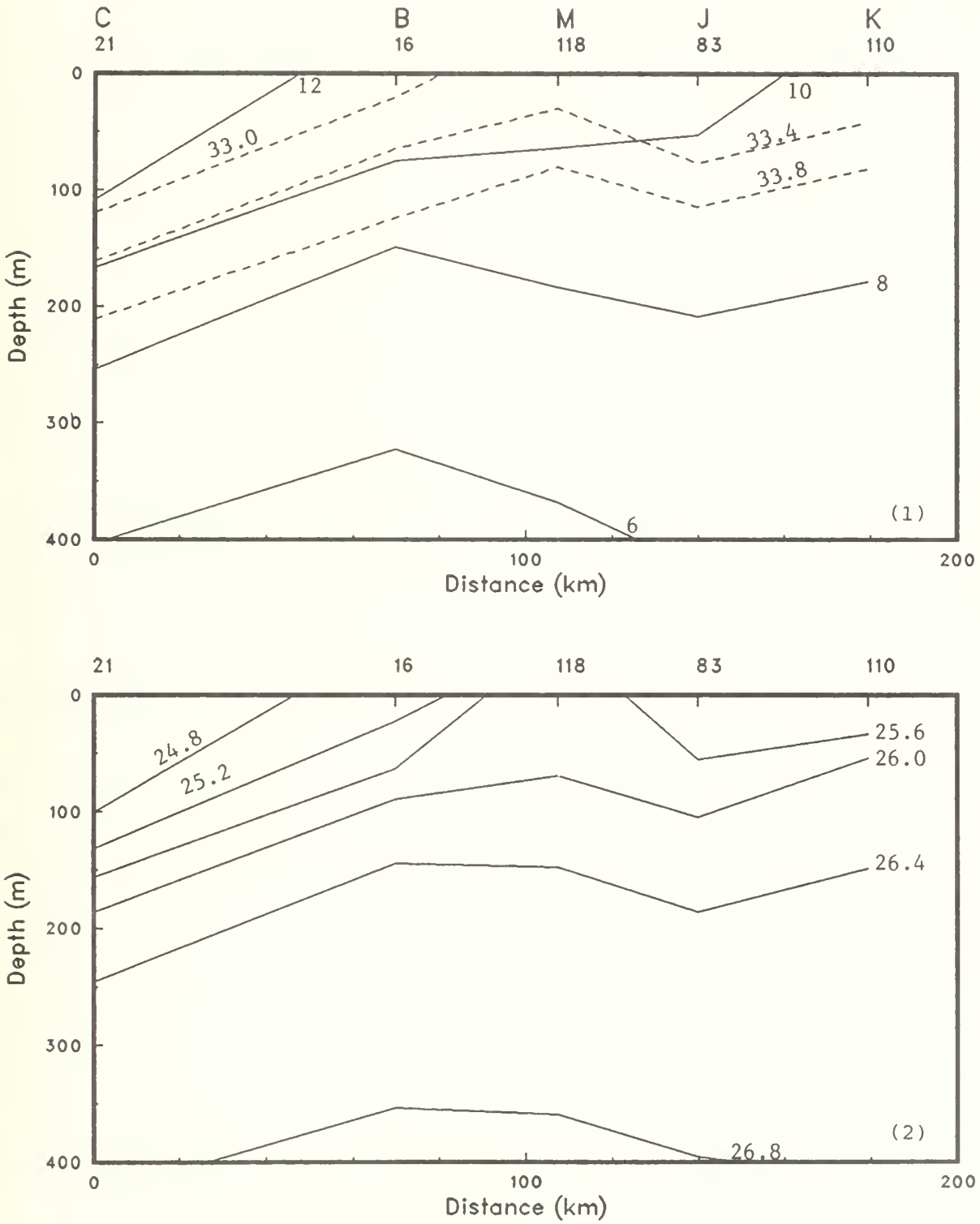

Figure 8(a): Isopleths of (1) temperature and salinity and (2) sigma-t from the CTD's. (OPTOMA11, Leg AI).

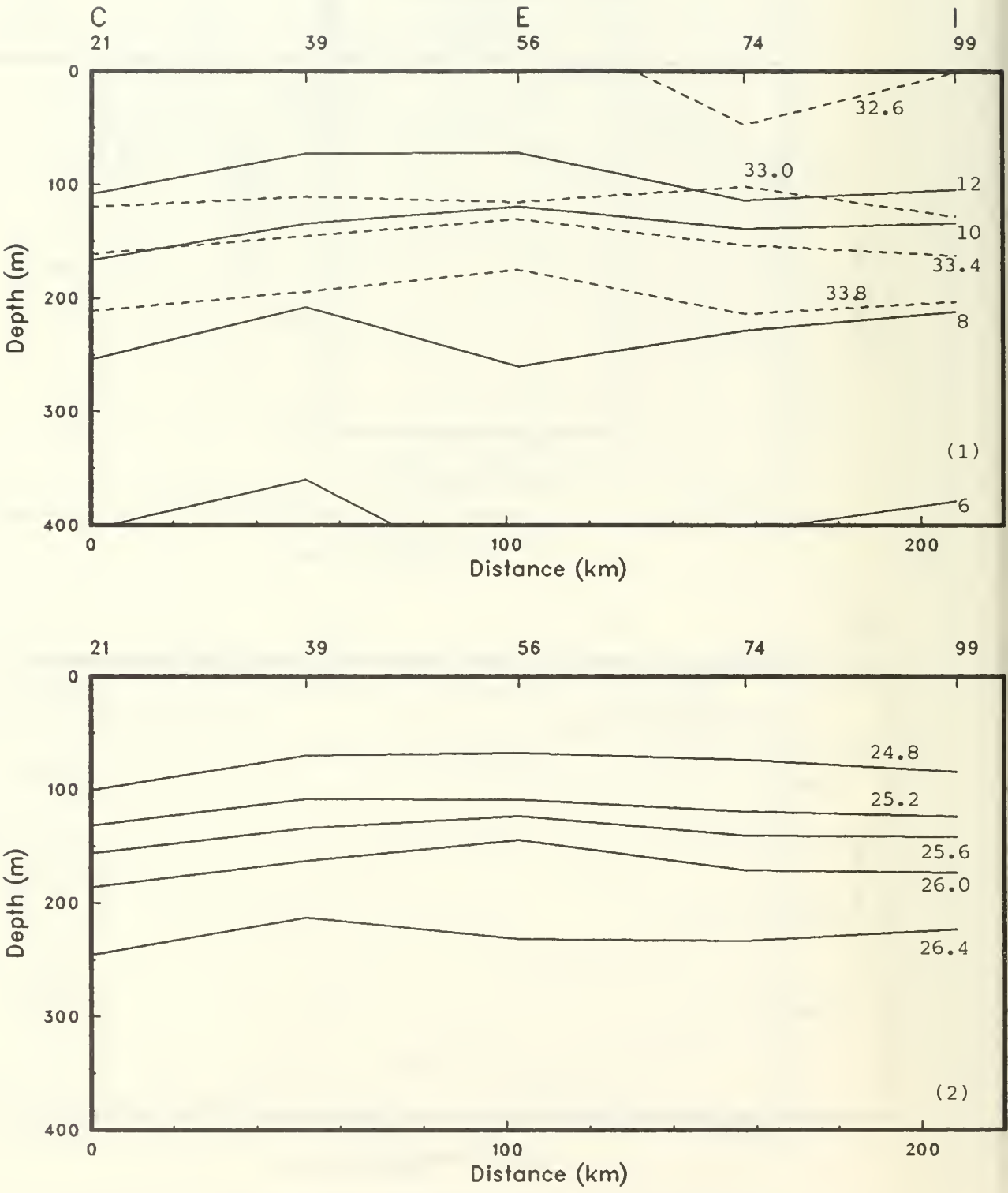
C
E
I
21
39
56
74
99
0
100
200
300
400
Depth (m)
32.6
33.0
12
10
33.4
33.8
8
(1)
6
0
100
200
Distance (km)
21
39
56
74
99
0
100
200
300
400
Depth (m)
24.8
25.2
25.6
26.0
26.4
(2)
0
100
200
Distance (km)

Figure 8(b).

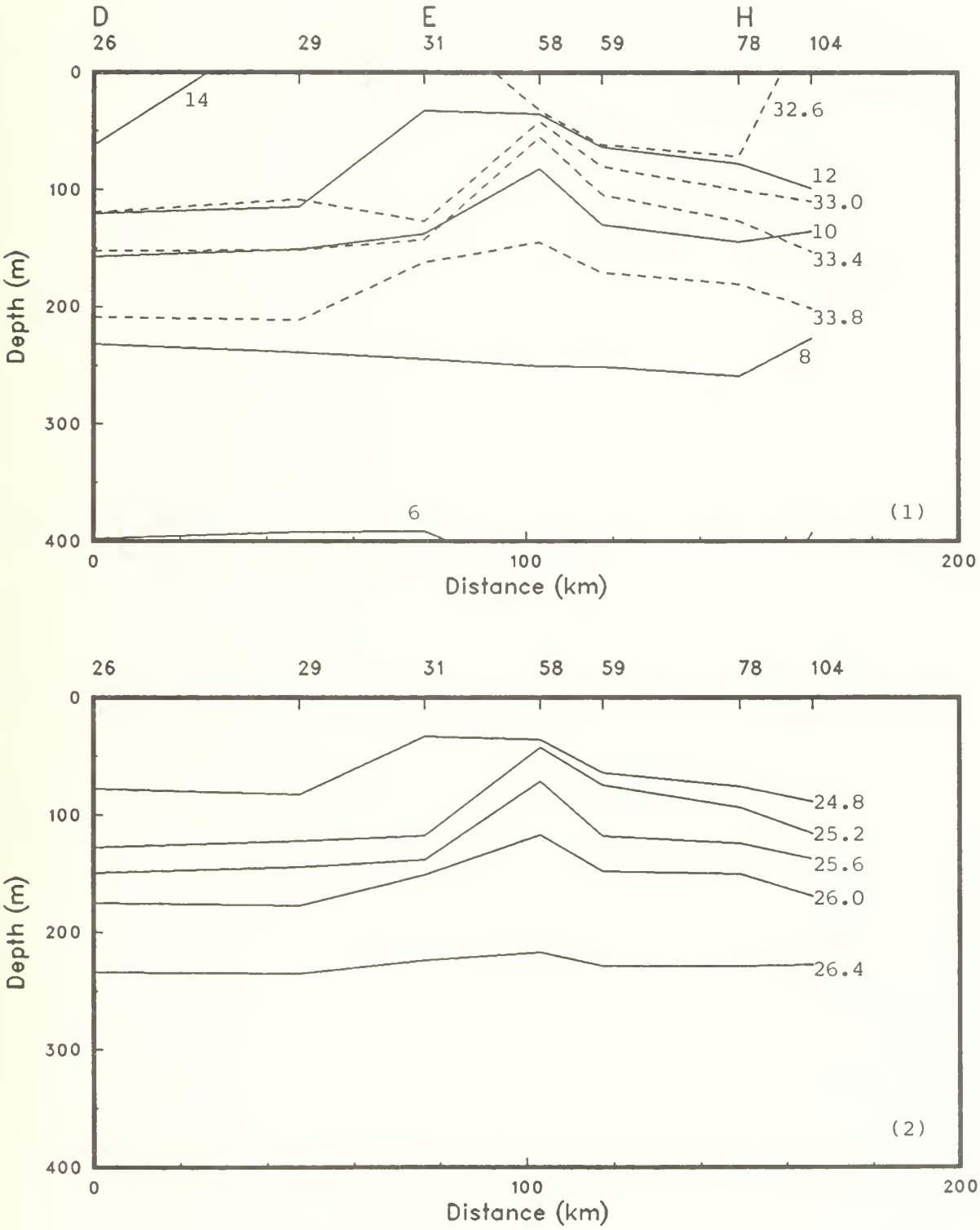
D
E
H
26
29
31
58
59
78
104
0
100
200
300
400
Depth (m)
14
32.6
12
33.0
10
33.4
33.8
8
6
(1)
0
100
200
Distance (km)
24.8
25.2
25.6
26.0
26.4
(2)

Figure 8(c).

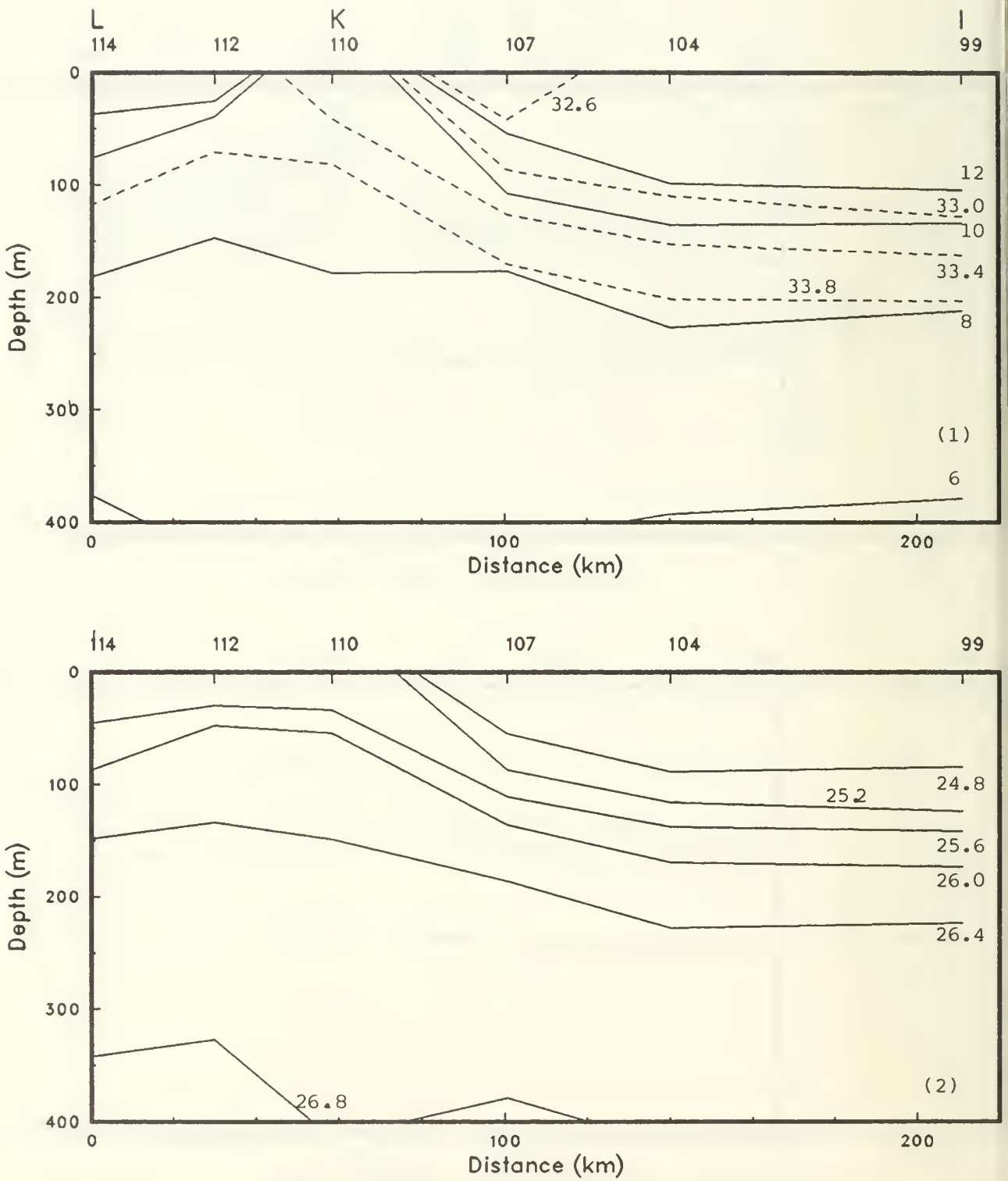
L
K
I
114
112
110
107
104
99
0
100
200
300
400
Depth (m)
32.6
12
33.0
10
33.4
33.8
8
(1)
6
0
100
200
Distance (km)
114
112
110
107
104
99
0
100
200
300
400
Depth (m)
24.8
25.2
25.6
26.0
26.4
26.8
(2)
0
100
200
Distance (km)

Figure 8(d).

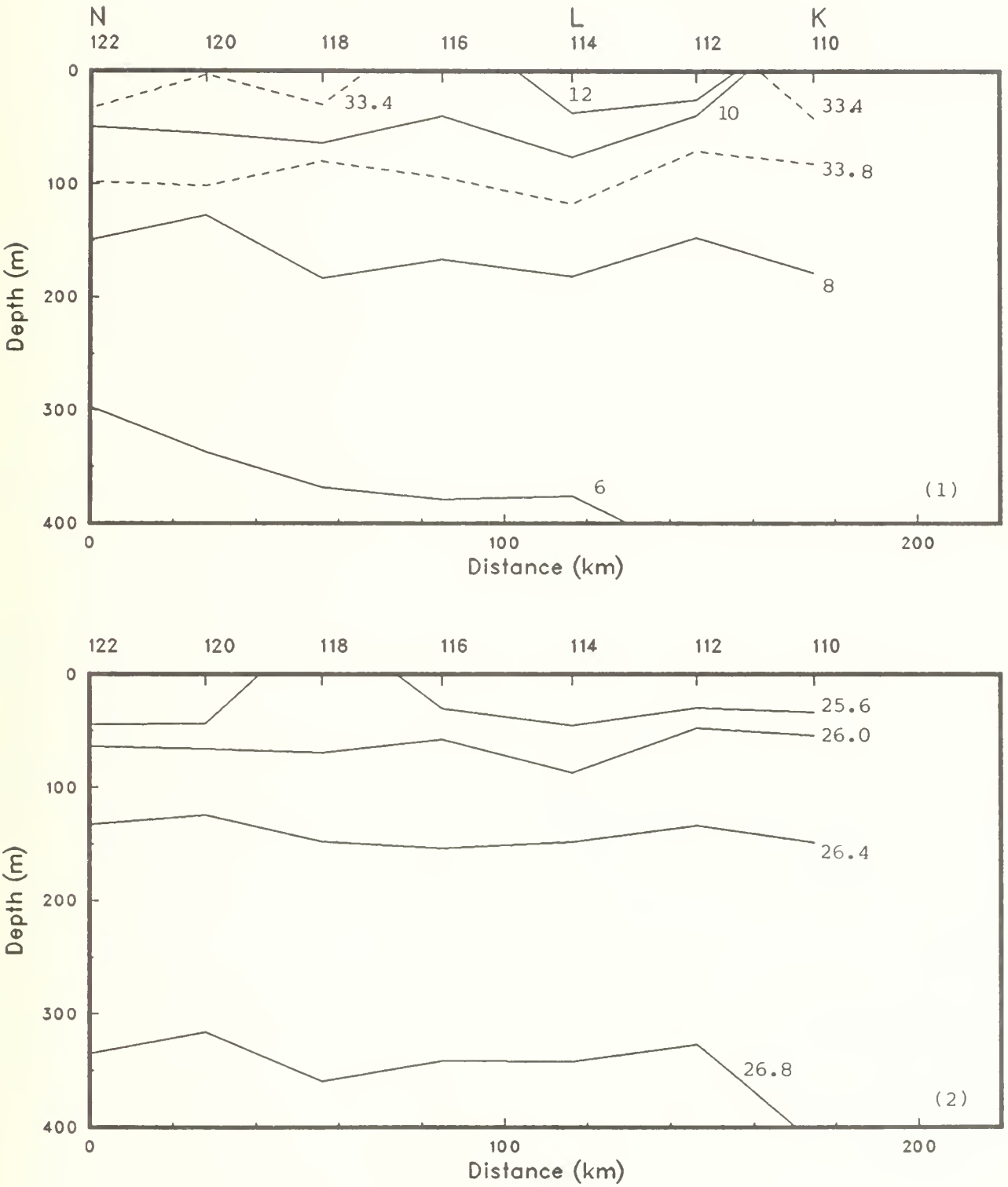
N
L
K
122
120
118
116
114
112
110
0
100
200
300
400
Depth (m)
33.4
12
10
33.4
33.8
8
6
(1)
0
100
200
Distance (km)
122
120
118
116
114
112
110
0
100
200
300
400
Depth (m)
25.6
26.0
26.4
26.8
(2)
0
100
200
Distance (km)

Figure 8(e).

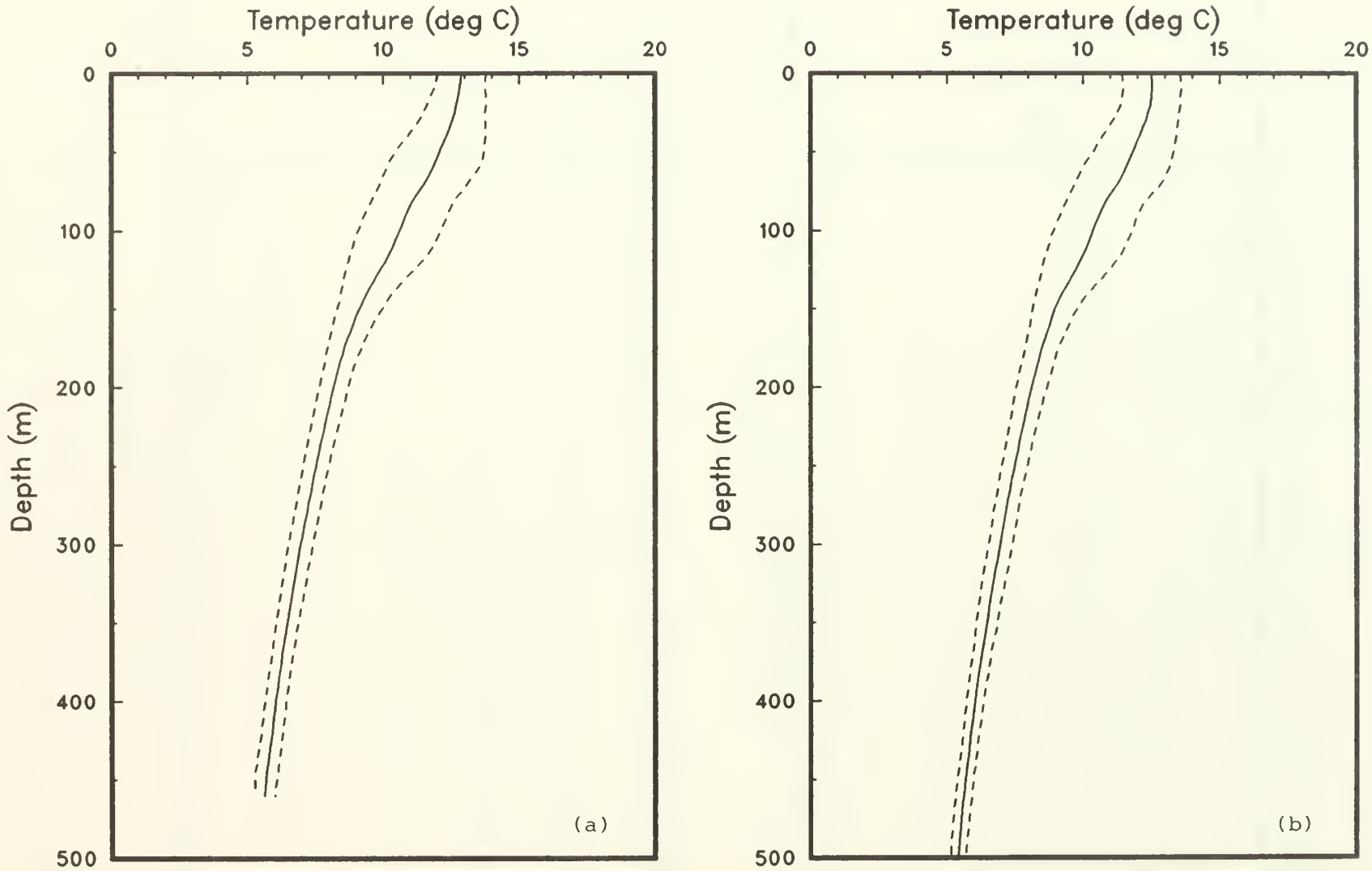

Figure 9: Mean temperature profiles from (a) XBT's and (b) CTD's, with + and - the standard deviation. (OPTOMA11, Leg AI).

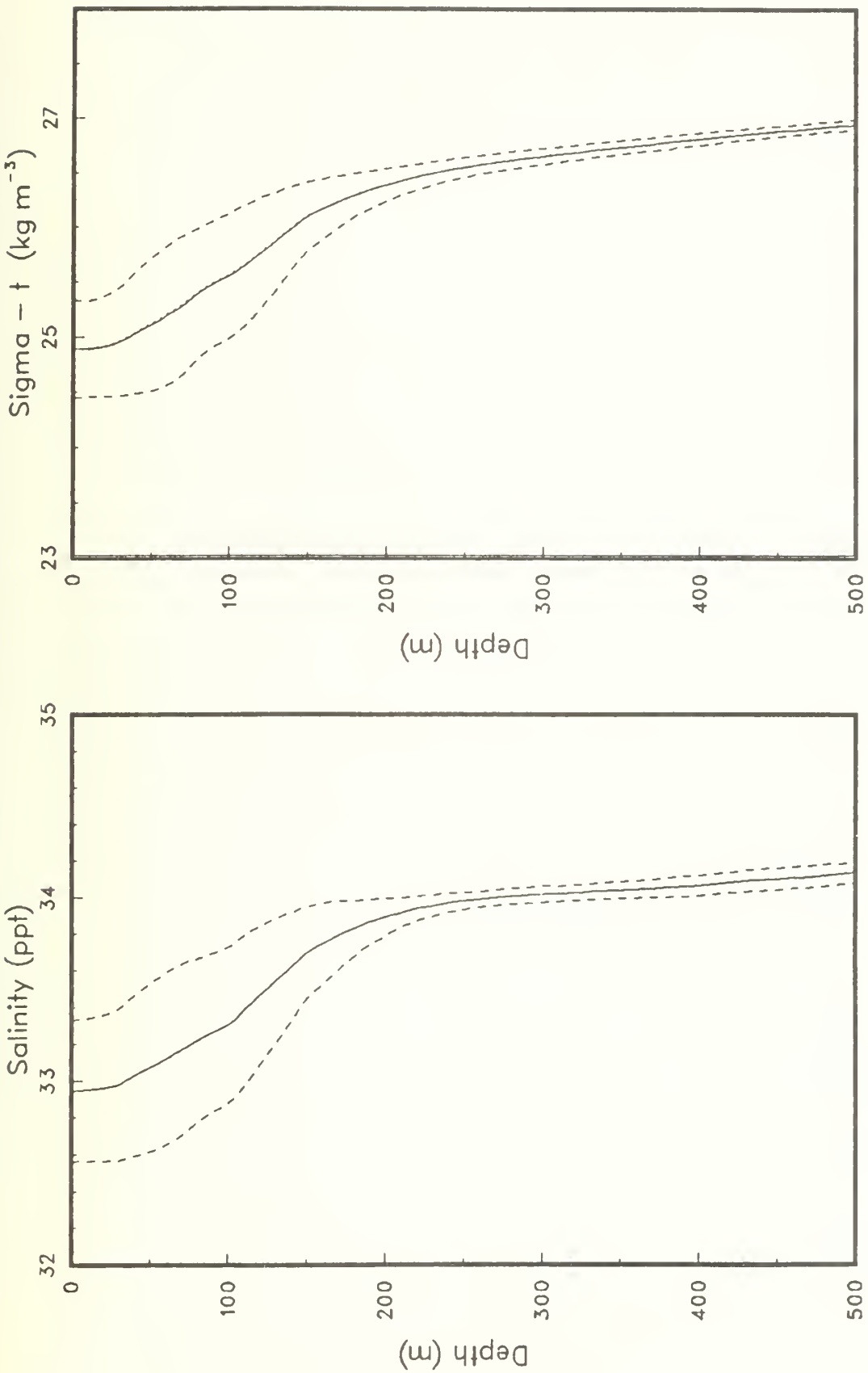

Figure 10: Mean profiles of (a) salinity and (b) sigma-t, with + and - the standard deviations, from the CTD's. (OPTOMA11, Leg AI).

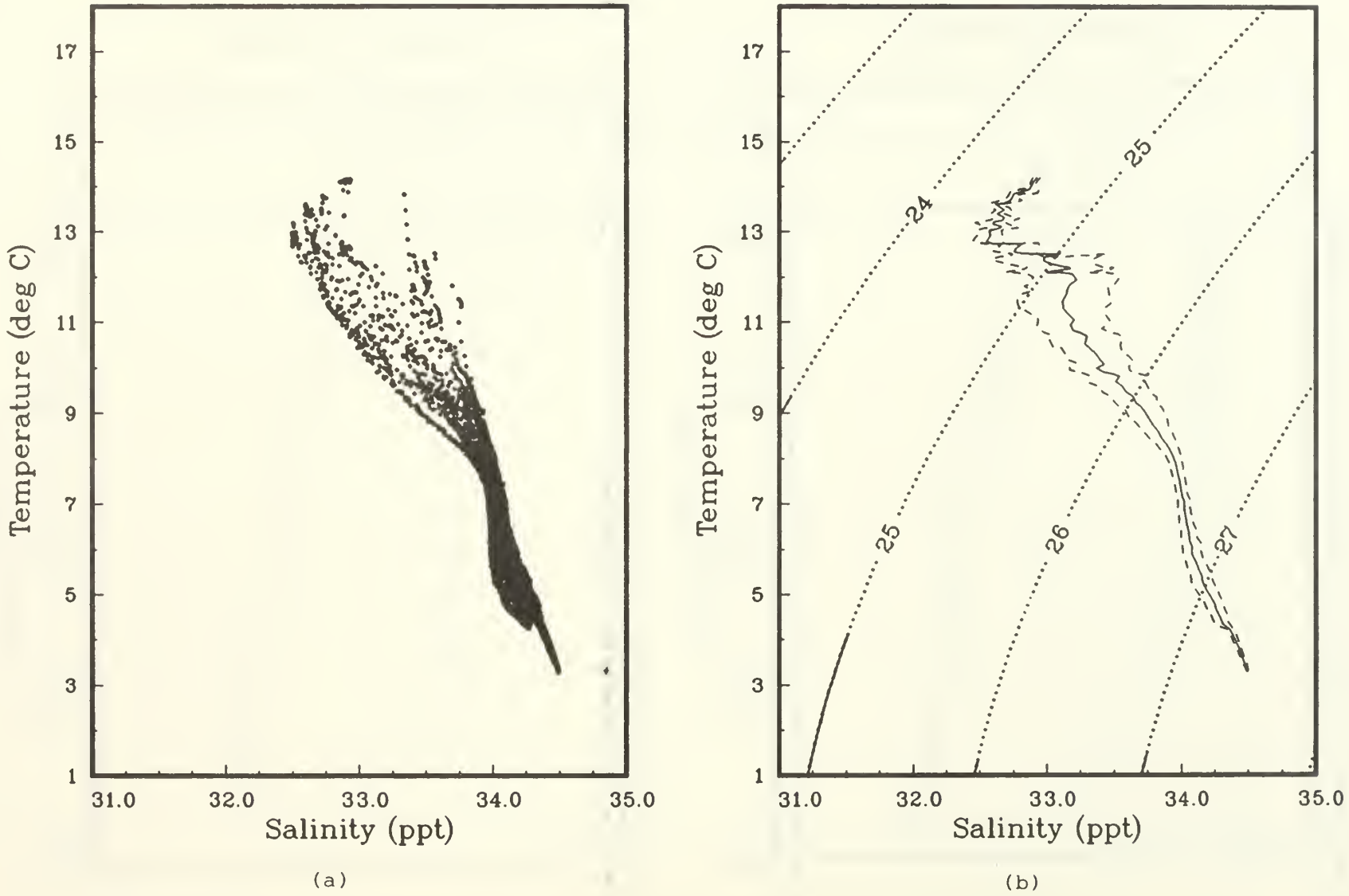

Figure 11: (a) T-S pairs and (b) mean T-S relation, with + and - the standard deviation, from the CTD's. Selected sigma-t contours are also shown. (OPTOMA11, Leg AI).

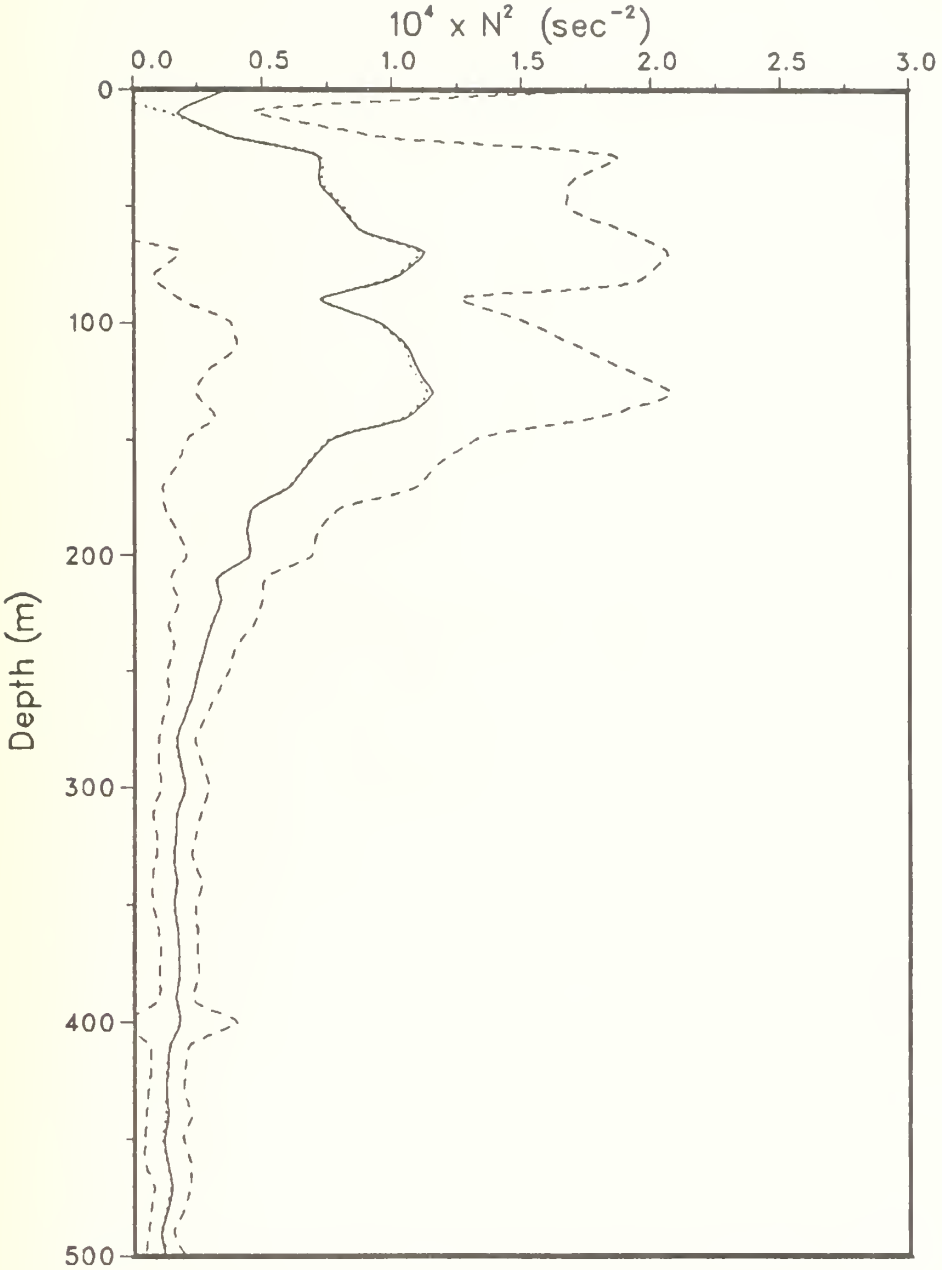

Figure 12: Mean N^2 profile (———), with + and - the standard deviation (----). The N^2 profile from $\overline{T(z)}$ and $\overline{S(z)}$ is also shown (••••). (OPTOMA11, Leg AI).

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Section 2

OPTOMAll Leg AII

21 - 30 June, 1984

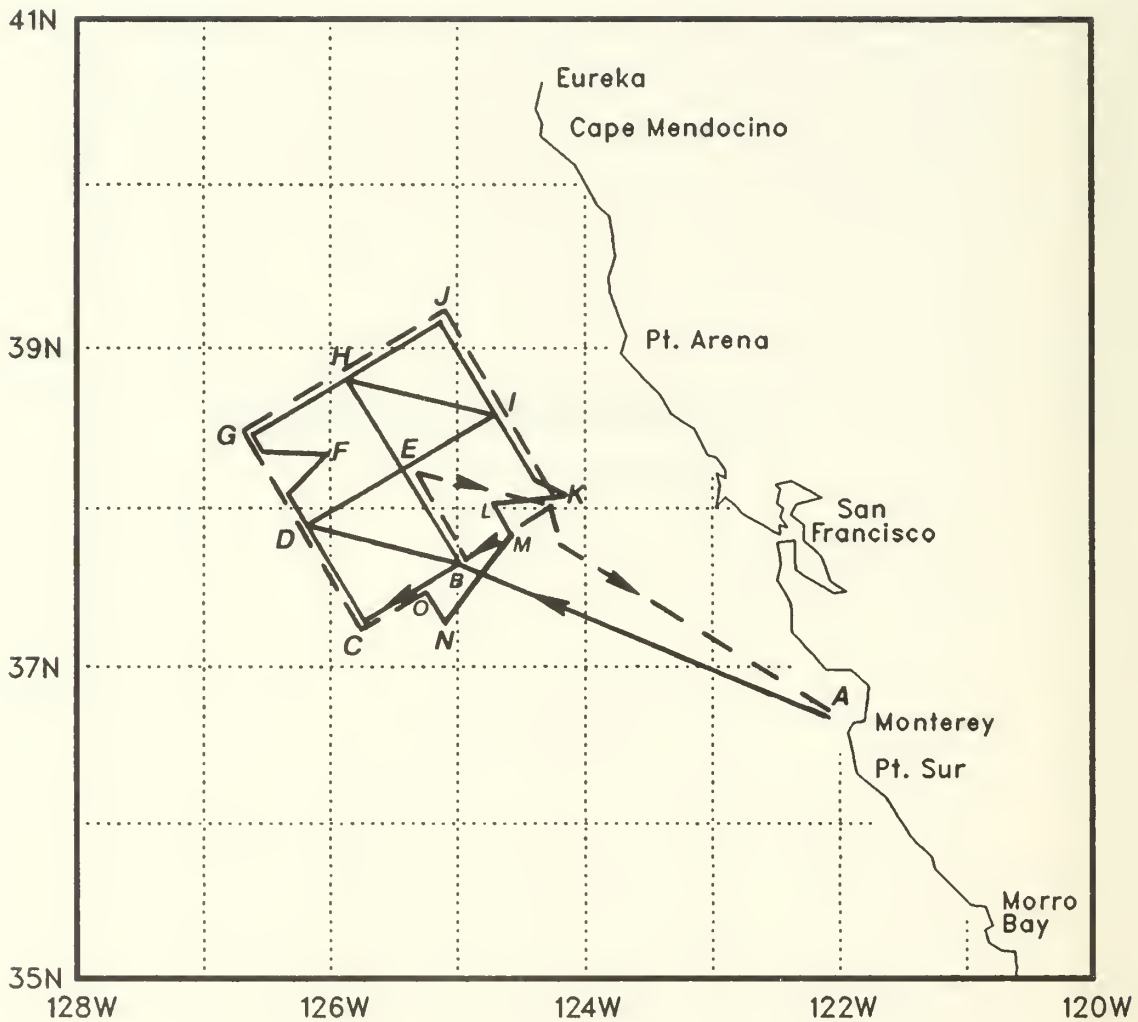

Figure 13: The cruise track for OPTOMA11, Leg AII. The first excursion of the track is shown as a solid line, the second excursion as a broken line.

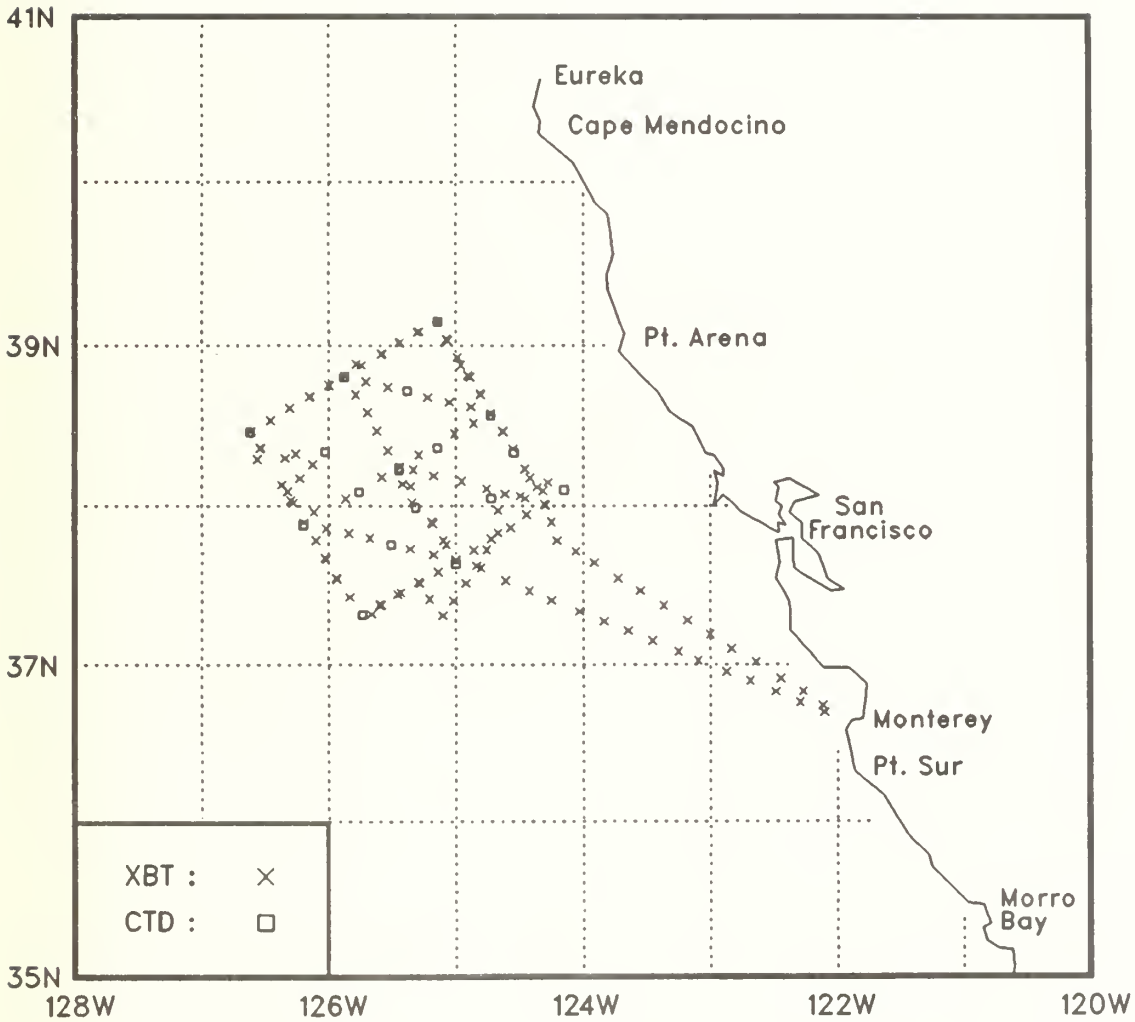

Figure 14: XBT and CTD locations for OPTOMA11, Leg AII.

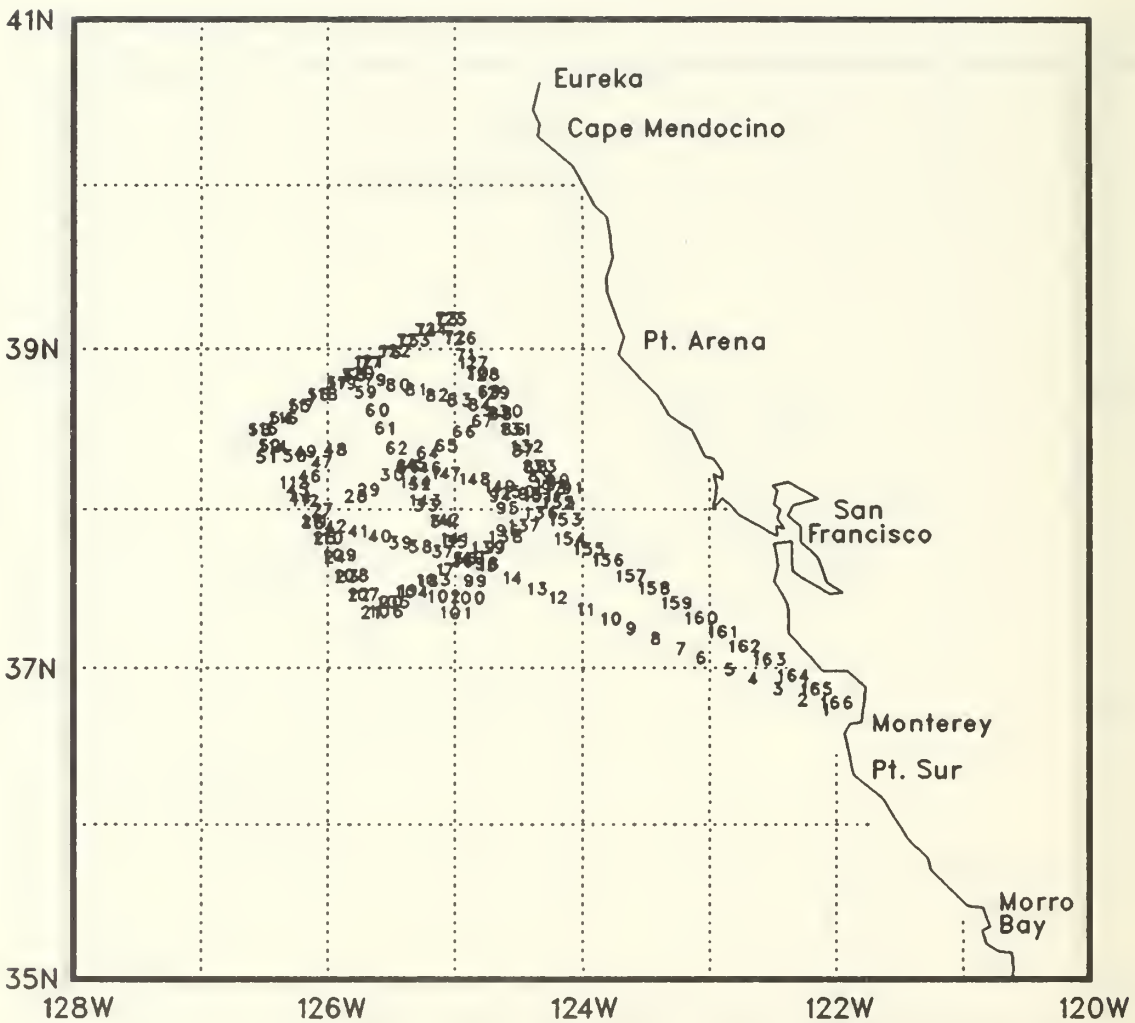

Figure 15: Station numbers for OPTOMA11, Leg AII.

Table 3 : Leg AII Station Listing

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
1	XBT	84174	335	36.42	122.06	12.0			
2	XBT	84174	578	36.46	122.18	12.3			
3	XBT	84174	719	36.50	122.29	12.7			
4	XBT	84174	907	36.54	122.41	12.6			
5	XBT	84174	1043	36.57	122.52	12.7			
6	XBT	84174	1233	37.02	123.06	11.8			
7	XBT	84174	1408	37.05	123.15	11.9			
8	XBT	84174	1555	37.09	123.27	12.2			
9	XBT	84174	1738	37.13	123.39	12.6			
10	XBT	84174	1928	37.17	123.50	12.0			
11	XBT	84174	2115	37.20	124.02	12.6			
12	XBT	84174	2315	37.25	124.15	12.6			
13	XBT	84175	100	37.28	124.25	12.7			
14	XBT	84175	306	37.32	124.36	12.7			
15	XBT	84175	504	37.37	124.48	12.6			
16	CTD	84175	714	37.39	125.00	12.5	33.35	12.2	33.43
17	XBT	84175	907	37.35	125.08	12.7			
18	XBT	84175	1018	37.31	125.17	12.2			
19	XBT	84175	1130	37.28	125.26	12.5			
20	XBT	84175	1240	37.23	125.35	11.9			
21	CTD	84175	1413	37.19	125.44	12.4	32.79	12.2	32.68
22	XBT	84175	1707	37.26	125.50	11.8			
23	XBT	84175	1820	37.33	125.56	11.7			
24	XBT	84175	1930	37.40	126.01	11.9			
25	XBT	84175	2040	37.47	126.06	11.8			
26	CTD	84175	2145	37.53	126.12	11.8	32.90	11.9	32.97
27	XBT	84175	2351	37.58	126.07	13.0			
28	XBT	84176	111	38.03	125.52	13.7			
29	CTD	84176	226	38.05	125.46	13.6	32.60	13.7	32.54
30	XBT	84176	520	38.11	125.35	13.6			
31	CTD	84176	638	38.14	125.27	13.5	32.68		
32	XBT	84176	840	38.08	125.21	13.7			
33	CTD	84176	943	38.00	125.19	13.5	32.64	13.5	32.69
34	XBT	84176	1232	37.54	125.11	12.0			
35	XBT	84176	1340	37.46	125.04	10.9			
36	XBT	84176	1438	37.40	125.00	12.5			
37	XBT	84176	1545	37.42	125.10	11.7			
38	XBT	84176	1637	37.44	125.21	11.7			
39	CTD	84176	1745	37.46	125.31	11.3	33.44	11.2	32.48
40	XBT	84176	1905	37.48	125.41	11.5			
41	XBT	84176	2000	37.50	125.50	11.6			
42	XBT	84176	2101	37.52	126.01	11.8			
43	CTD	84176	2215	37.53	126.12	12.7	32.78	13.2	32.84
44	XBT	84177	35	38.02	126.18	14.0			
45	XBT	84177	100	38.06	126.19	13.8			

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
46	XBT	84177	200	38.11	126.14	13.8			
47	XBT	84177	255	38.16	126.08	13.7			
48	CTD	84177	356	38.21	126.02	13.8	32.68	13.7	32.69
49	XBT	84177	600	38.20	126.16	14.0			
50	XBT	84177	650	38.18	126.21	13.8			
51	XBT	84177	733	38.18	126.34	13.8			
52	XBT	84177	815	38.22	126.32	14.0			
53	CTD	84177	930	38.28	126.37	13.9	32.70	13.8	32.69
54	XBT	84177	1053	38.32	126.27	13.9			
55	XBT	84177	1155	38.37	126.18	13.9			
56	XBT	84177	1255	38.41	126.09	14.1			
57	XBT	84177	1353	38.45	126.00	14.0			
58	CTD	84177	1443	38.48	125.53	14.2	32.65	14.1	32.70
59	XBT	84177	1615	38.42	125.47	13.8			
60	XBT	84177	1707	38.35	125.42	13.9			
61	XBT	84177	1800	38.28	125.37	13.8			
62	XBT	84177	1855	38.21	125.32	13.7			
63	CTD	84177	1941	38.14	125.27	13.7	32.60	13.7	32.64
64	XBT	84177	2138	38.19	125.17	13.7			
65	CTD	84177	2242	38.22	125.09	13.7	32.57	13.7	32.97
66	XBT	84178	46	38.27	125.01	14.0			
67	XBT	84178	150	38.31	124.51	14.0			
68	CTD	84178	250	38.34	124.43	13.8	32.66	13.7	32.69
69	XBT	84178	455	38.42	124.48	13.9			
70	XBT	84178	600	38.49	124.54	13.9			
71	XBT	84178	700	38.56	124.59	13.9			
72	XBT	84178	750	39.02	125.05	14.0			
73	CTD	84178	855	39.09	125.09	13.6	32.53	13.6	32.57
74	XBT	84178	1030	39.05	125.18	13.6			
75	XBT	84178	1126	39.01	125.27	13.8			
76	XBT	84178	1223	38.57	125.35	14.6			
77	XBT	84178	1323	38.53	125.45	14.1			
78	CTD	84178	1426	38.48	125.53	14.5	32.67	14.4	32.68
79	XBT	84178	1600	38.47	125.42	14.5			
80	XBT	84178	1652	38.45	125.32	14.2			
81	CTD	84178	1745	38.43	125.23	14.3	32.61	14.2	32.66
82	XBT	84178	1908	38.41	125.13	14.0			
83	XBT	84178	2000	38.39	125.03	14.0			
84	XBT	84178	2055	38.37	124.53	14.5			
85	CTD	84178	2150	38.34	124.43	14.2	32.66	14.2	32.70
86	XBT	84178	2340	38.28	124.37	13.8			
87	CTD	84179	25	38.20	124.33	12.0	32.93	12.0	32.97
88	XBT	84179	218	38.14	124.27	11.8			
89	XBT	84179	245	38.11	124.25	12.2			
90	XBT	84179	336	38.09	124.17	11.4			

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
91	CTD	84179	425	38.06	124.09	11.7	33.66	11.5	32.68
92	XBT	84179	610	38.06	124.19	11.7			
93	XBT	84179	702	38.04	124.29	11.9			
94	CTD	84179	805	38.03	124.43	11.3	33.17	11.1	33.48
95	XBT	84179	915	37.59	124.40	11.9			
96	XBT	84179	1005	37.50	124.40	12.8			
97	XBT	84179	1055	37.44	124.45	13.0			
98	XBT	84179	1150	37.38	124.50	13.4			
99	XBT	84179	1244	37.31	124.55	13.2			
100	XBT	84179	1340	37.25	125.01	13.0			
101	XBT	84179	1430	37.19	125.06	13.5			
102	XBT	84179	1530	37.25	125.12	12.3			
103	XBT	84179	1627	37.31	125.18	13.5			
104	XBT	84179	1730	37.27	125.28	13.8			
105	XBT	84179	1843	37.23	125.36	13.7			
106	XBT	84179	1930	37.20	125.40	13.9			
107	XBT	84179	2040	37.26	125.50	13.3			
108	XBT	84179	2145	37.33	125.56	12.3			
109	XBT	84179	2250	37.41	126.02	12.7			
110	XBT	84179	2345	37.47	126.06	14.1			
111	XBT	84180	43	37.54	126.12	14.3			
112	XBT	84180	140	38.01	126.17	14.4			
113	XBT	84180	245	38.08	126.22	14.5			
114	XBT	84180	426	38.22	126.32	14.8			
115	XBT	84180	530	38.28	126.37	14.7			
116	XBT	84180	630	38.32	126.28	14.7			
117	XBT	84180	730	38.37	126.18	14.7			
118	XBT	84180	830	38.41	126.09	15.1			
119	XBT	84180	932	38.45	126.00	15.2			
120	XBT	84180	1019	38.49	125.52	15.0			
121	XBT	84180	1125	38.53	125.47	15.0			
122	XBT	84180	1226	38.57	125.35	14.7			
123	XBT	84180	1323	39.01	125.26	14.6			
124	XBT	84180	1420	39.05	125.17	13.9			
125	XBT	84180	1521	39.09	125.08	14.2			
126	XBT	84180	1615	39.02	125.04	13.7			
127	XBT	84180	1723	38.53	124.58	14.0			
128	XBT	84180	1753	38.48	124.53	14.2			
129	XBT	84180	1848	38.42	124.48	14.2			
130	XBT	84180	1936	38.35	124.43	13.8			
131	XBT	84180	2030	38.28	124.38	13.3			
132	XBT	84180	2118	38.22	124.33	12.5			
133	XBT	84180	2216	38.14	124.27	12.2			
134	XBT	84180	2312	38.07	124.22	11.4			
135	XBT	84181	5	38.01	124.18	11.4			

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)
136	XBT	84181	100	37.57	124.27	13.1
137	XBT	84181	153	37.52	124.34	12.8
138	XBT	84181	250	37.48	124.43	13.2
139	XBT	84181	340	37.44	124.51	13.8
140	XBT	84181	440	37.40	125.00	13.9
141	XBT	84181	540	37.47	125.06	12.4
142	XBT	84181	640	37.54	125.11	13.1
143	XBT	84181	747	38.01	125.21	14.4
144	XBT	84181	847	38.08	125.25	14.4
145	XBT	84181	947	38.15	125.26	14.3
146	XBT	84181	1045	38.14	125.20	14.4
147	XBT	84181	1147	38.12	125.10	14.4
148	XBT	84181	1247	38.10	124.57	13.8
149	XBT	84181	1352	38.07	124.45	13.3
150	XBT	84181	1508	38.05	124.37	11.5
151	XBT	84181	1618	38.03	124.27	11.4
152	XBT	84181	1720	38.01	124.18	12.8
153	XBT	84181	1895	37.54	124.15	13.0
154	XBT	84181	1900	37.47	124.12	13.3
155	XBT	84181	2000	37.43	124.03	13.4
156	XBT	84181	2057	37.39	123.55	13.4
157	XBT	84181	2217	37.33	123.43	13.1
158	XBT	84181	2333	37.28	123.33	13.0
159	XBT	84182	55	37.23	123.22	12.3
160	XBT	84182	215	37.17	123.11	12.5
161	XBT	84182	333	37.12	123.00	12.8
162	XBT	84182	454	37.06	122.50	13.1
163	XBT	84182	615	37.01	122.39	12.4
164	XBT	84182	753	36.55	122.27	11.8
165	XBT	84182	980	36.50	122.16	11.0
166	XBT	84182	1025	36.45	122.07	11.6

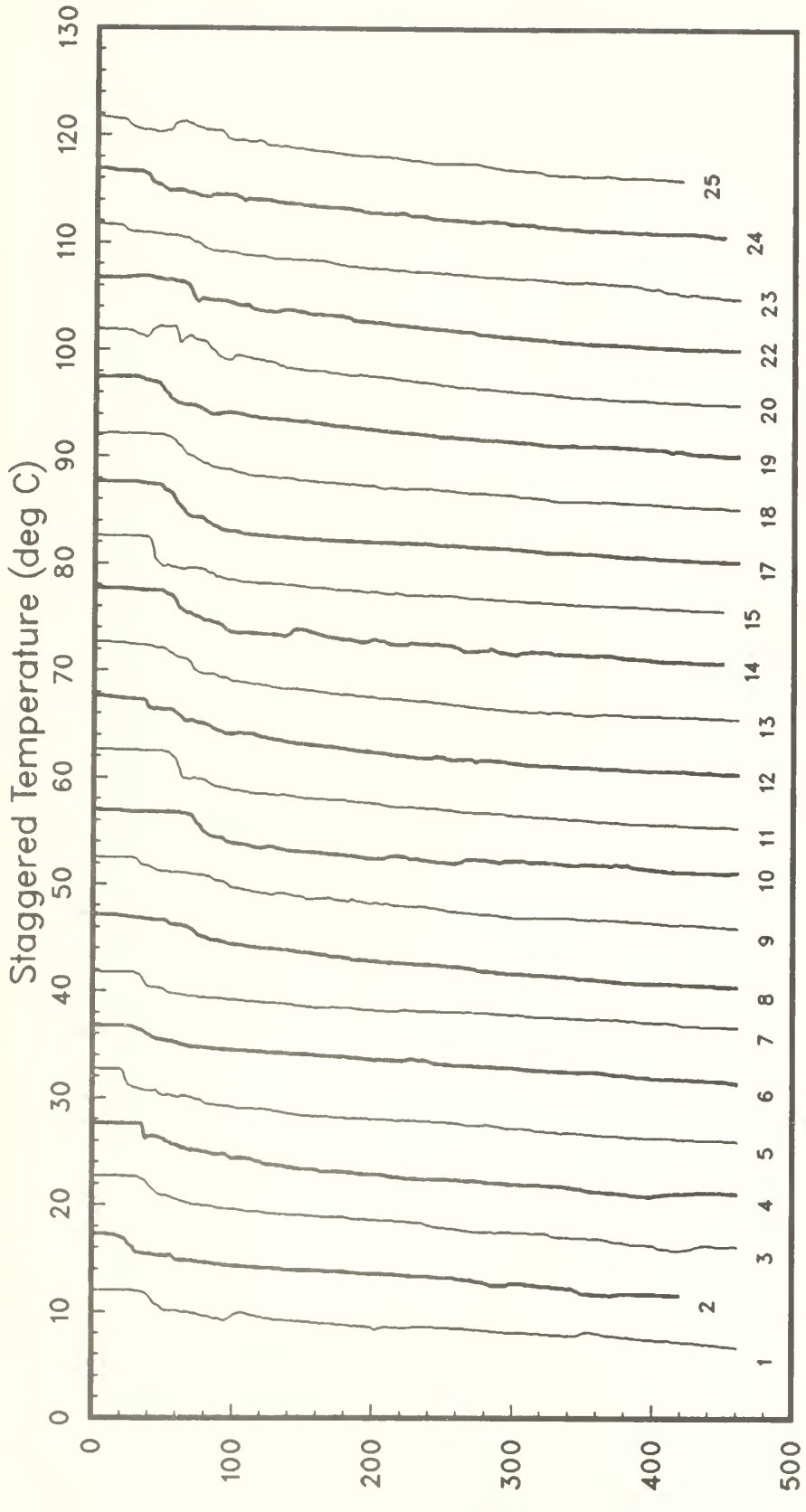

Figure 16(a): XBT temperature profiles, staggered by multiples of 5C. (OPTOMA11, Leg AII).

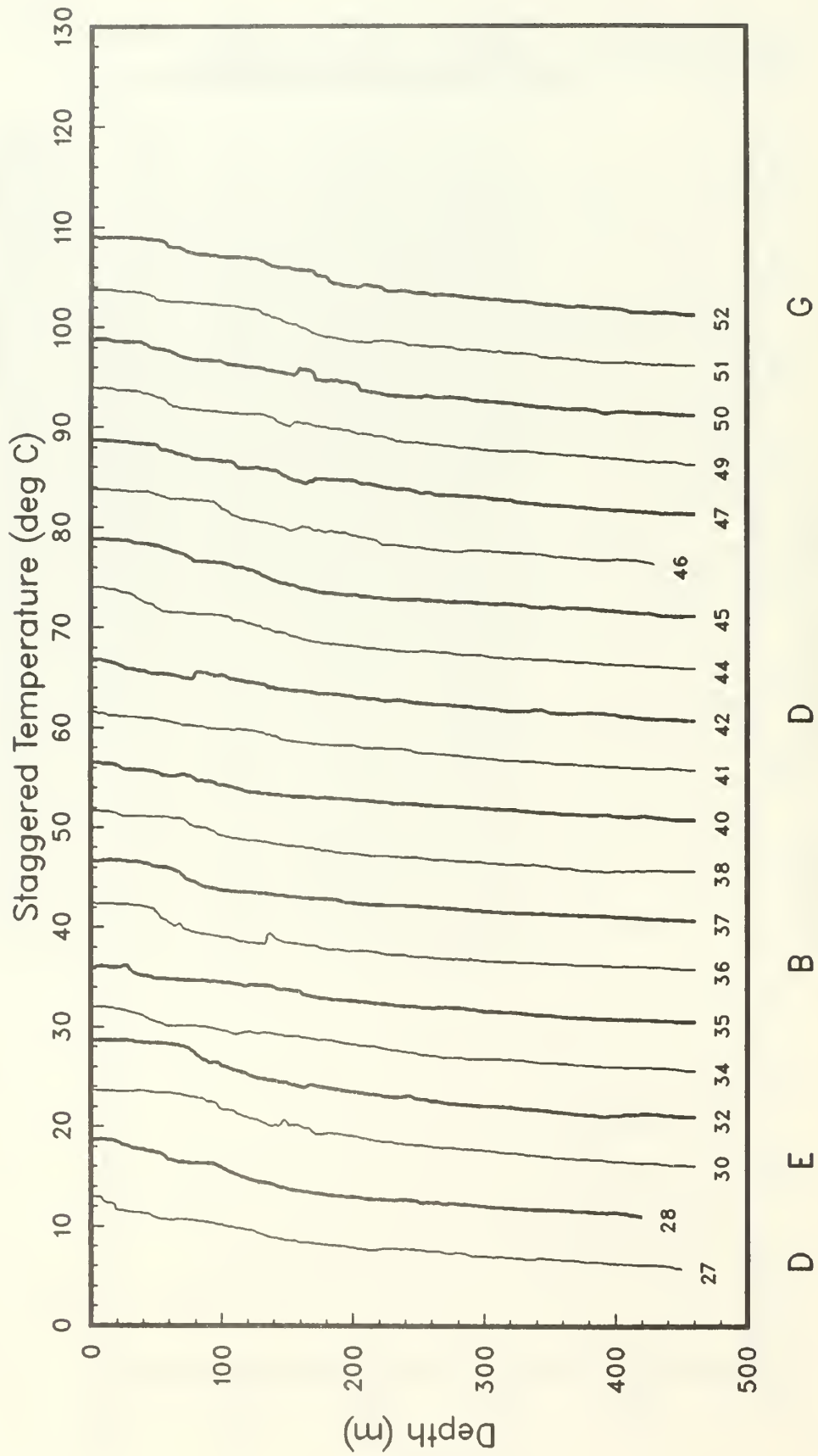
Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
Depth (m)
0
100
200
300
400
500
27
28
30
32
34
35
36
37
38
40
41
42
44
45
46
47
49
50
51
52
D
E
B
D
G

Figure 16(b).

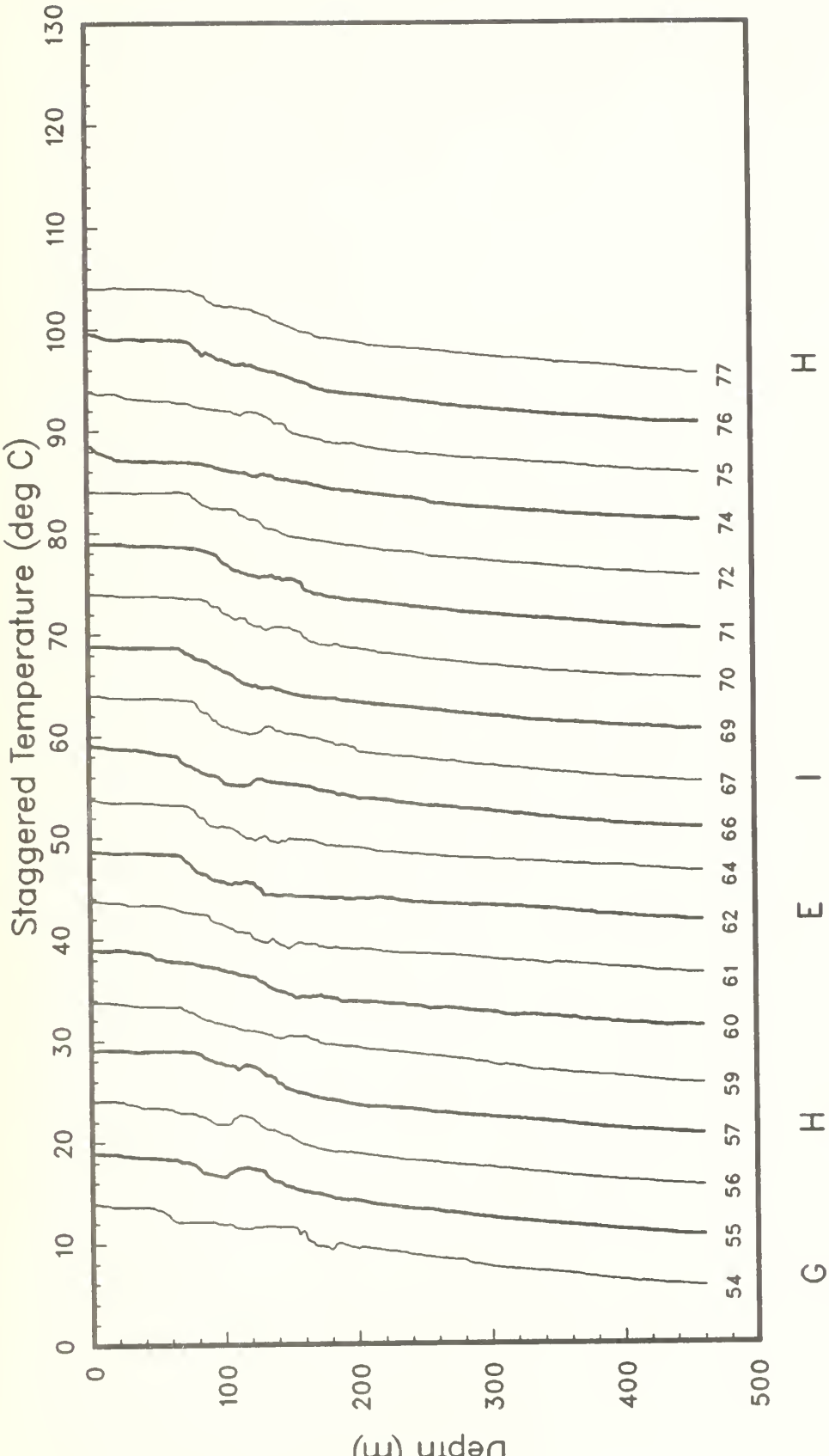
Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
Depth (m)
0
100
200
300
400
500
54
55
56
57
59
60
61
62
64
66
67
69
70
71
72
74
75
76
77
G
H
E
I
H

Figure 16(c).

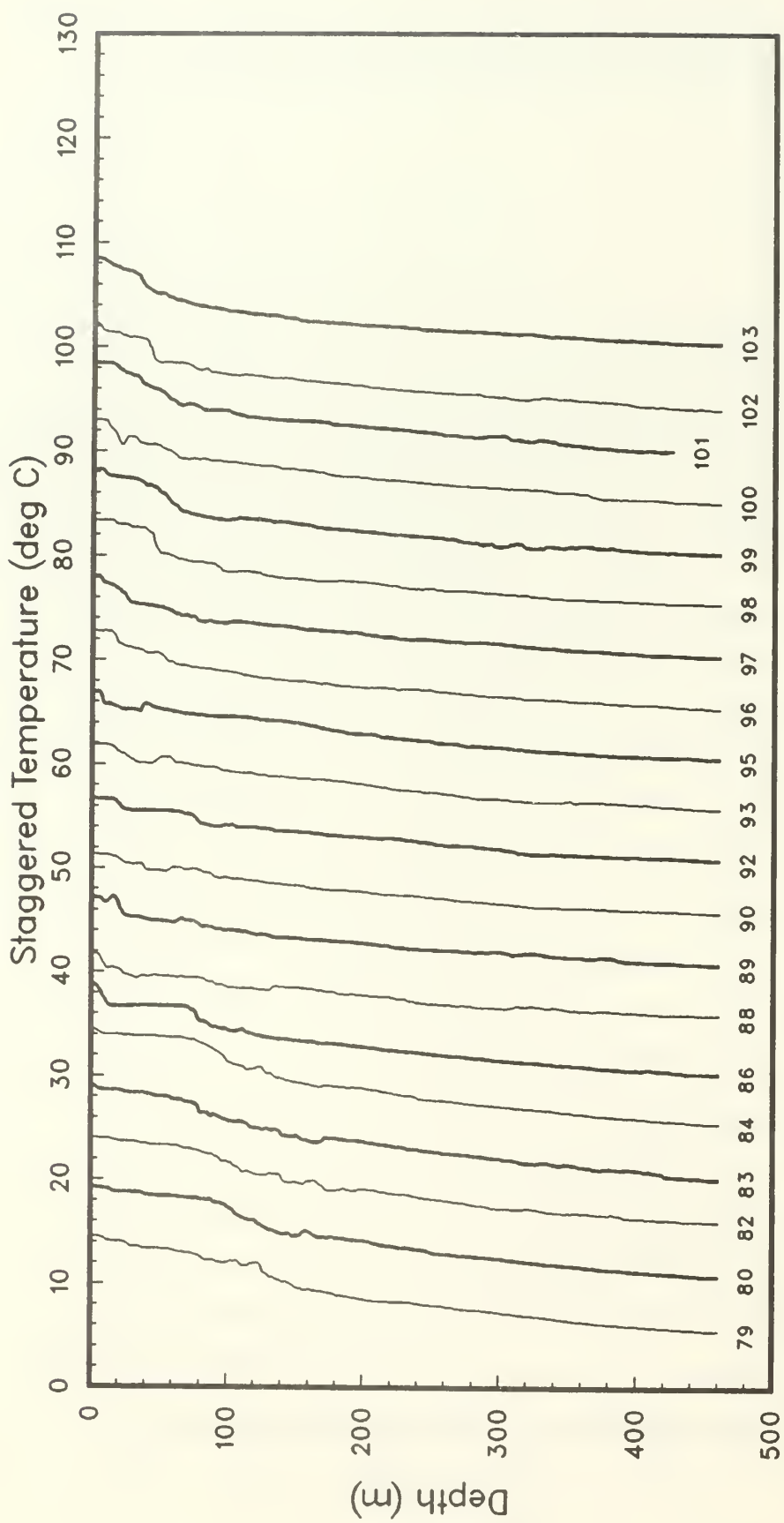
Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
Depth (m)
0
100
200
300
400
500
79
80
82
83
84
86
88
89
90
92
93
95
96
97
98
99
100
101
102
103
H
I
K
L
M
N
O

Figure 16(d).

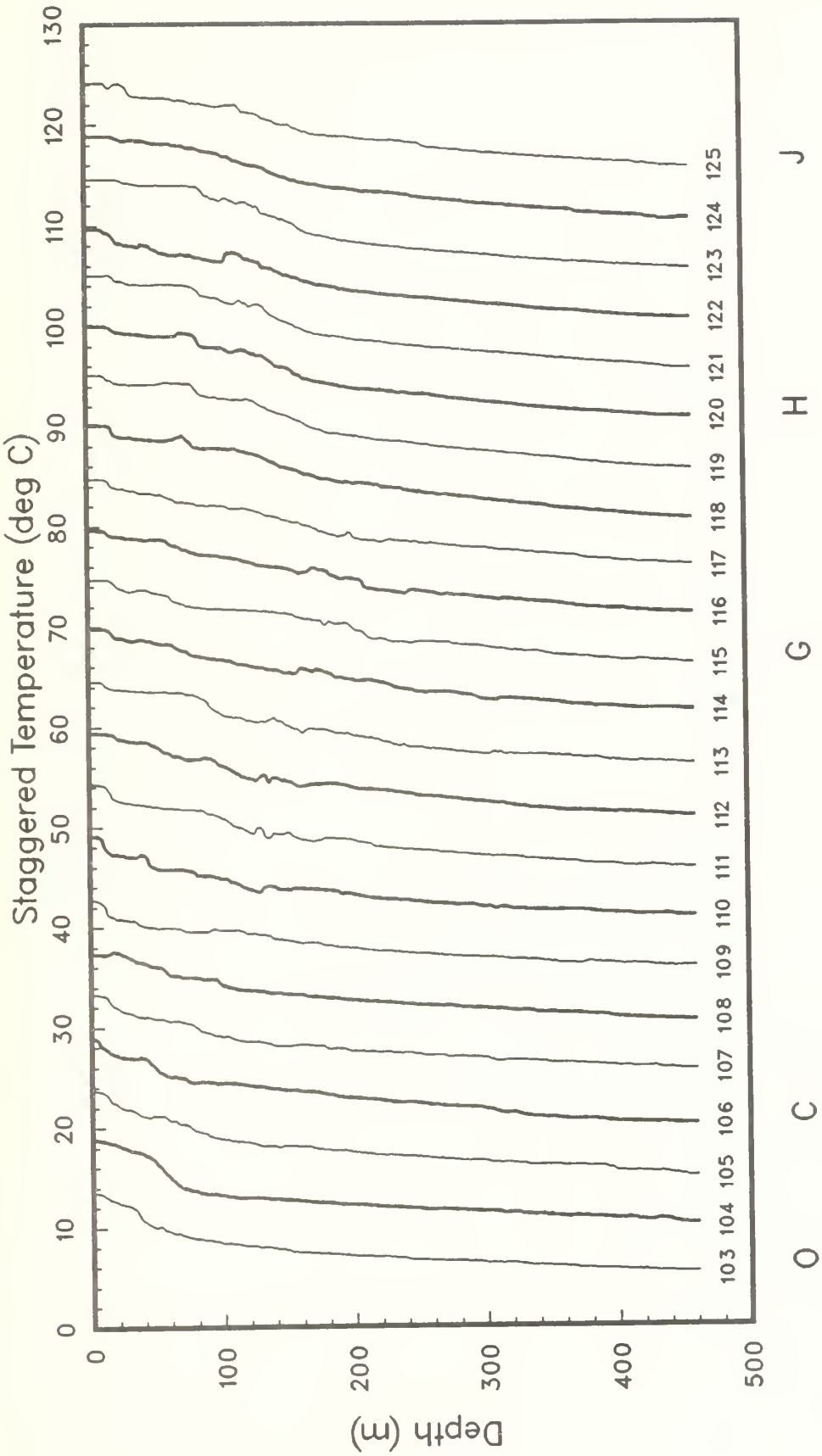
Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
Depth (m)
0
100
200
300
400
500
103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125
O
C
G
H
J

Figure 16(e).

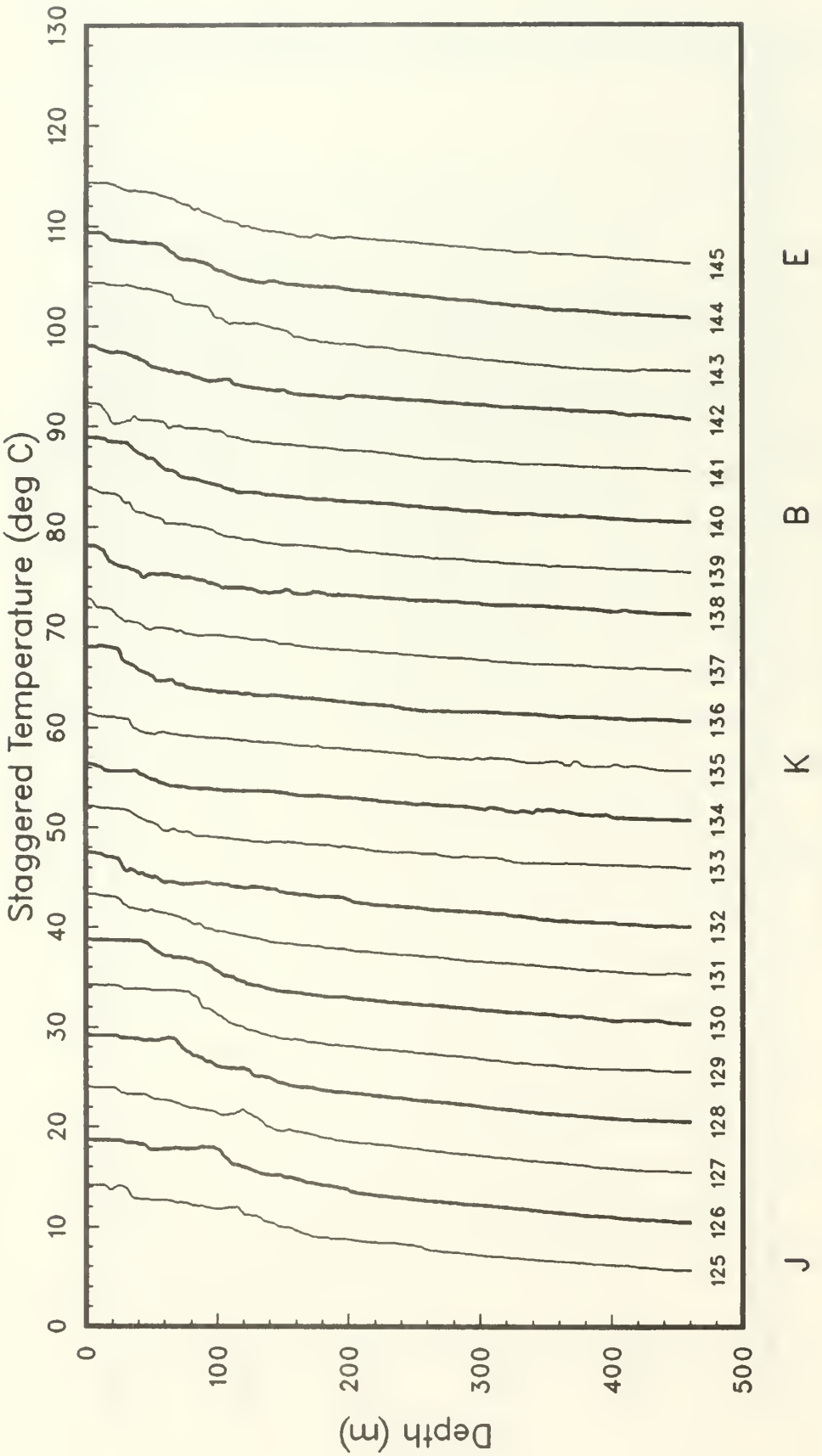
Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
Depth (m)
0
100
200
300
400
500
125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145
J
K
B
E

Figure 16(f).

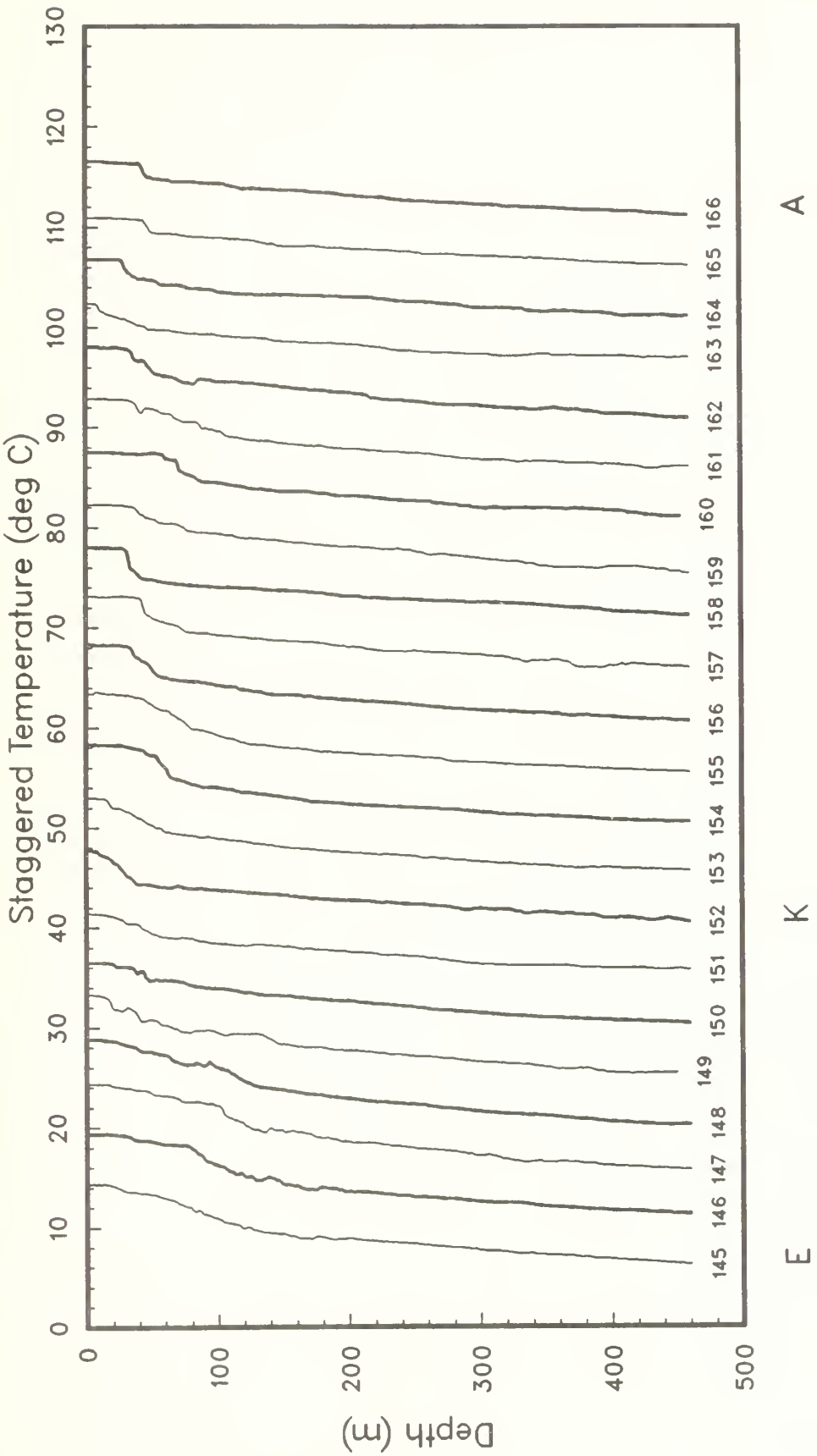
Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
Depth (m)
0
100
200
300
400
500
145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166
E
K
A

Figure 16(g).

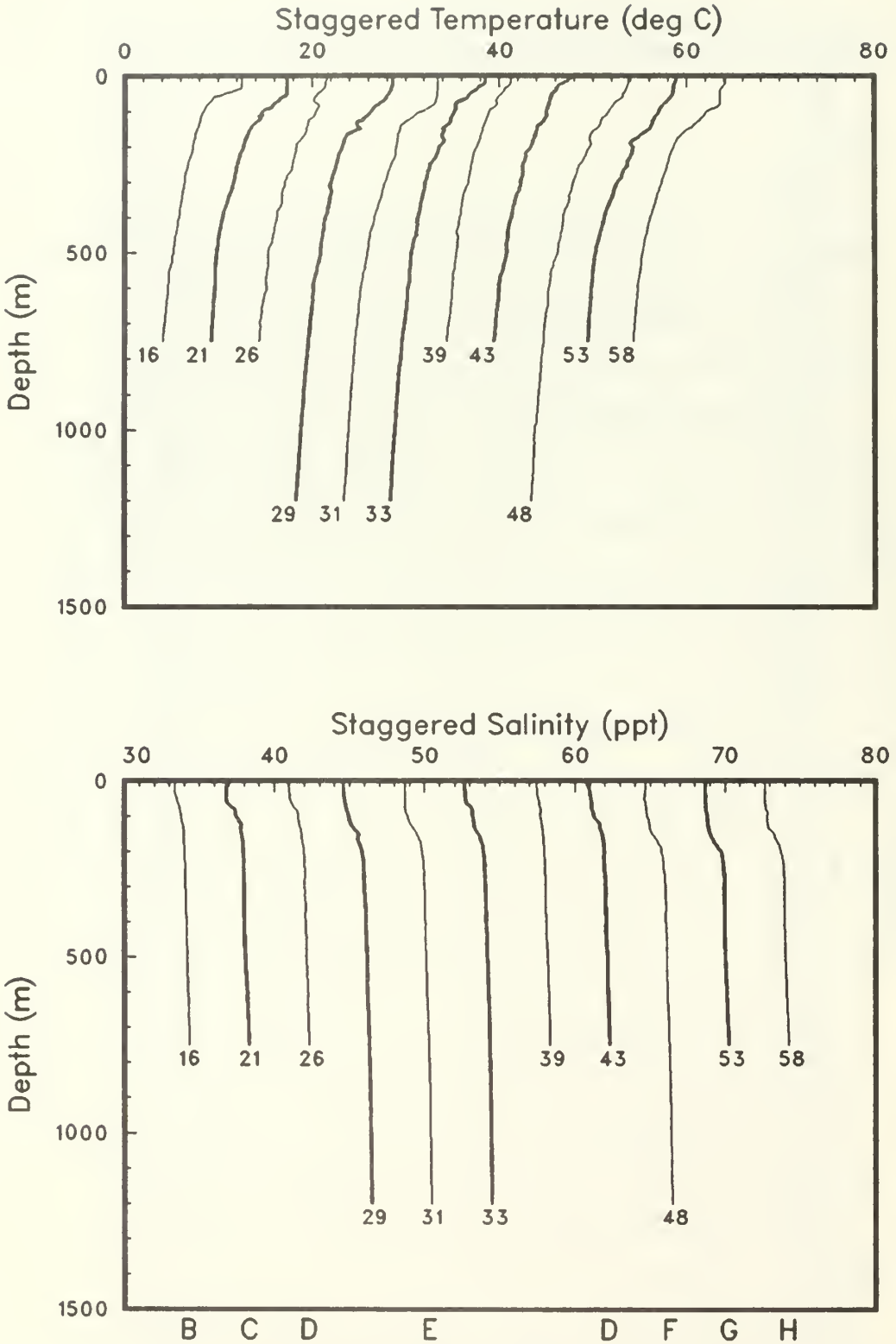

Figure 17(a): CTD temperature profiles, staggered by multiples of 5C, and salinity profiles, staggered by multiples of 4 ppt. (OPTOMA11, Leg AII).

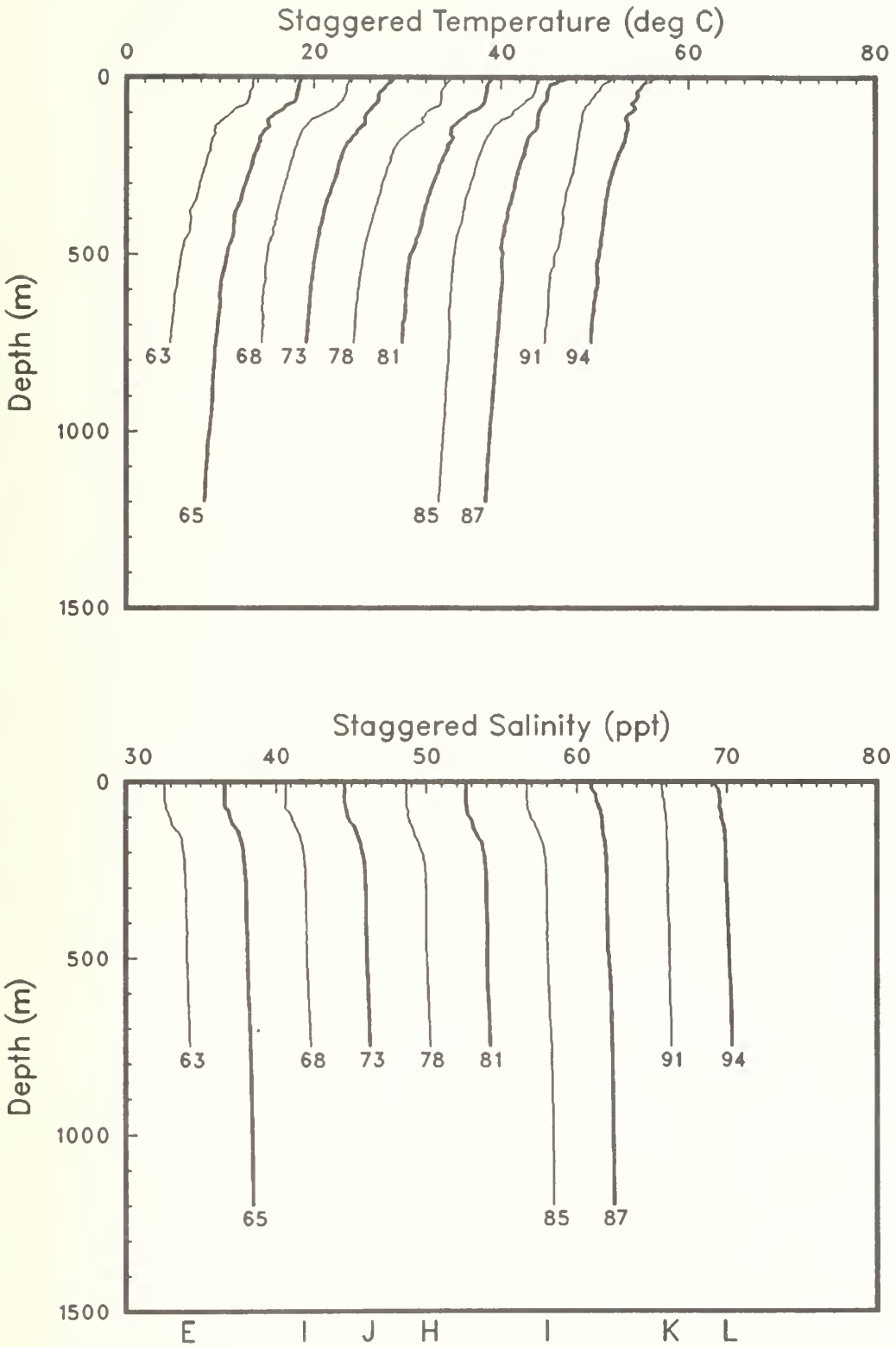
Staggered Temperature (deg C)
0
20
40
60
80
Depth (m)
0
500
1000
1500
63
65
68
73
78
81
85
87
91
94
Staggered Salinity (ppt)
30
40
50
60
70
80
E
I
J
H
I
K
L

Figure 17(b).

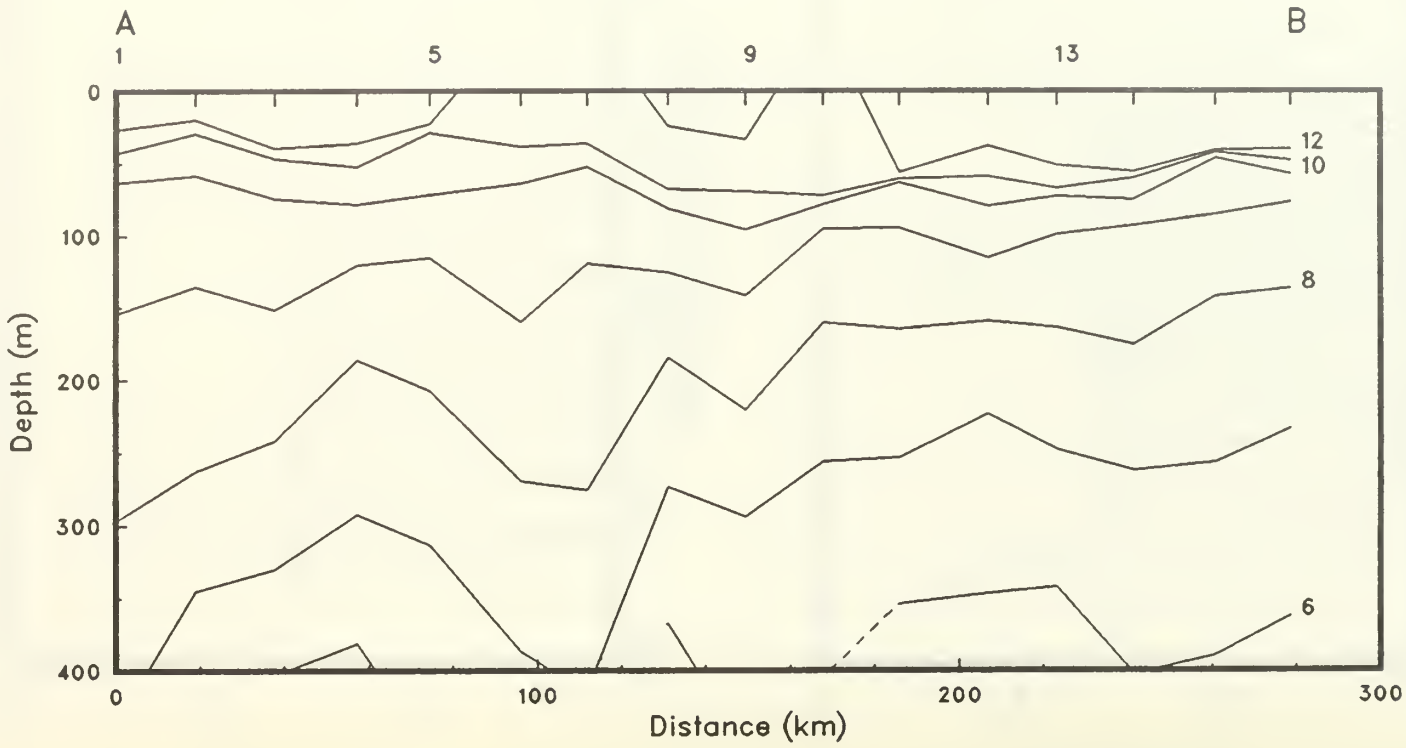

Figure 18(a): Along-track isotherms. Tick marks along the upper horizontal axis show station positions. Some station numbers are given. Dashed lines are used if the cast was too shallow. (OPTOMA11, Leg AII).

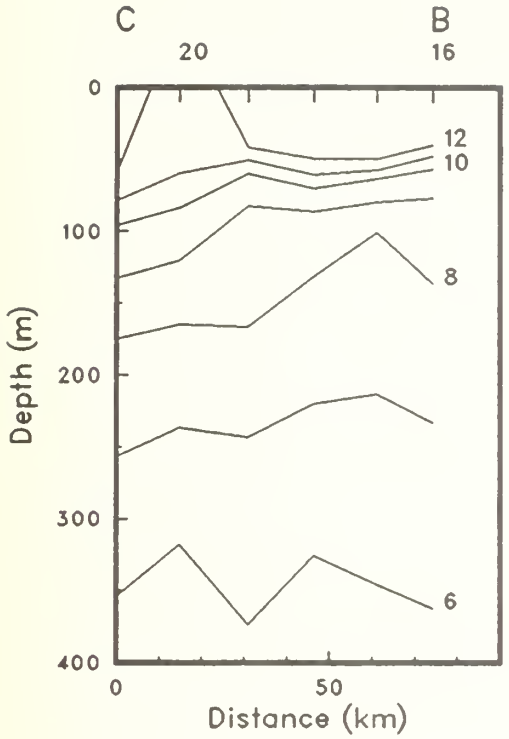

Figure 18(b).

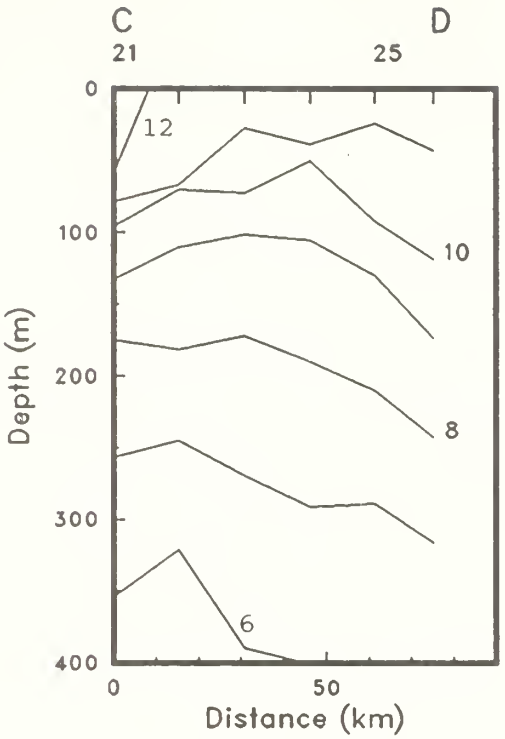

Figure 18(c).

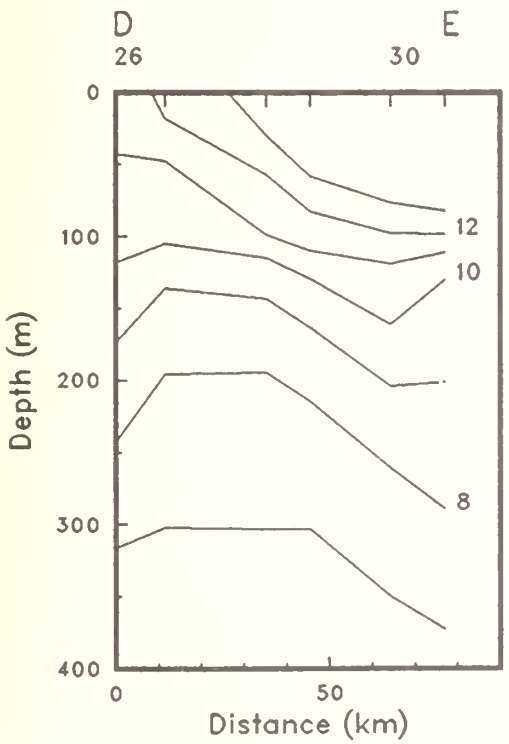

Figure 18(d).

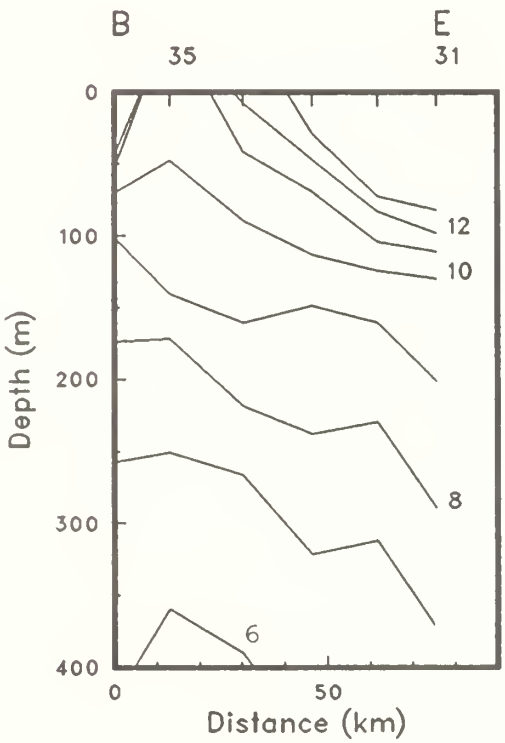

Figure 18(e).

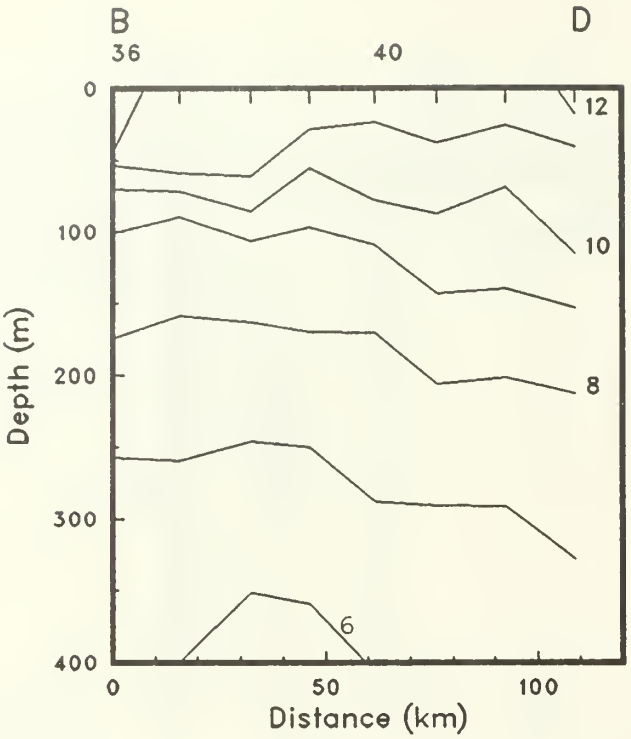

Figure 18(f).

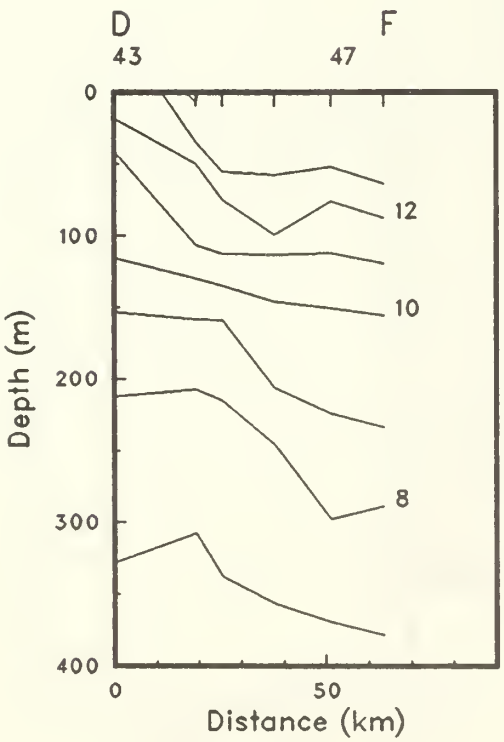

Figure 18(g).

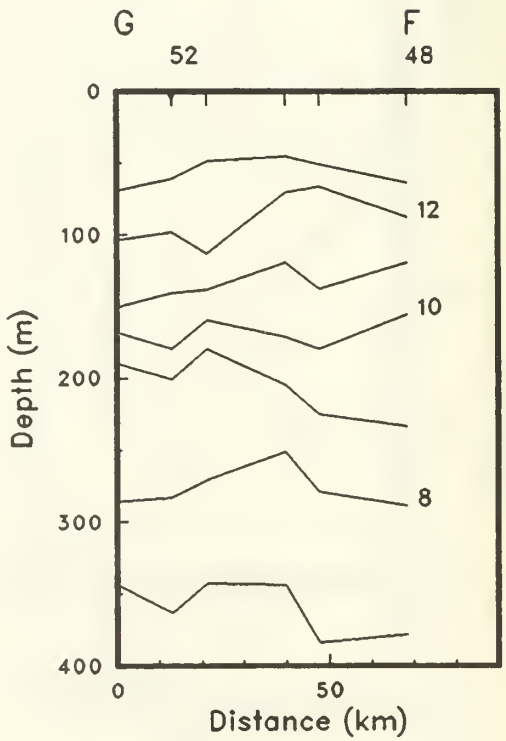

Figure 18(h).

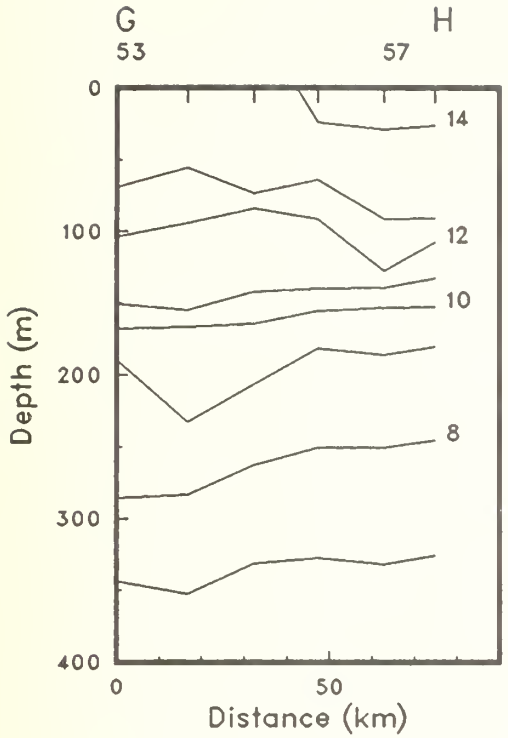

Figure 18(i).

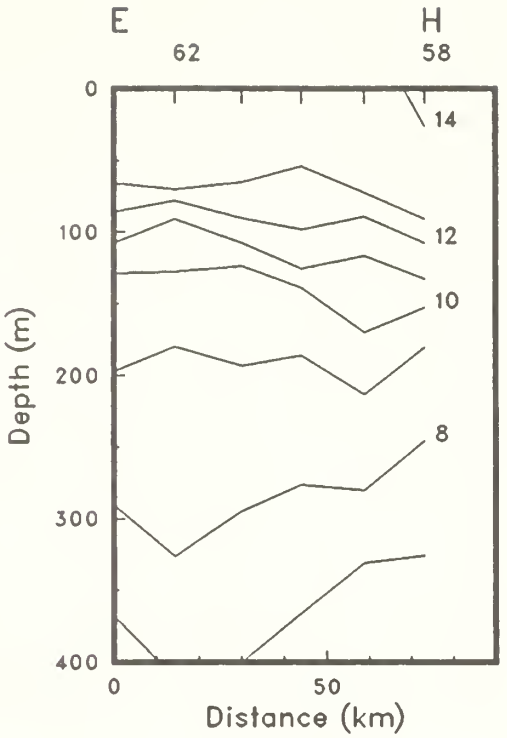

Figure 18(j).

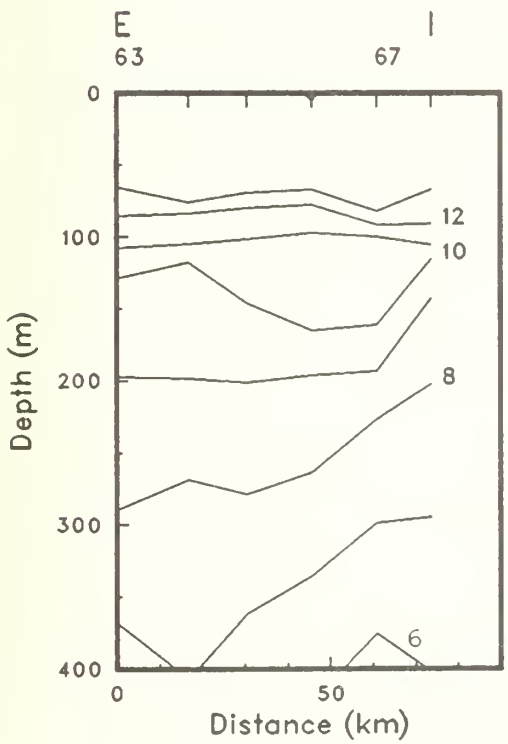

Figure 18(k).

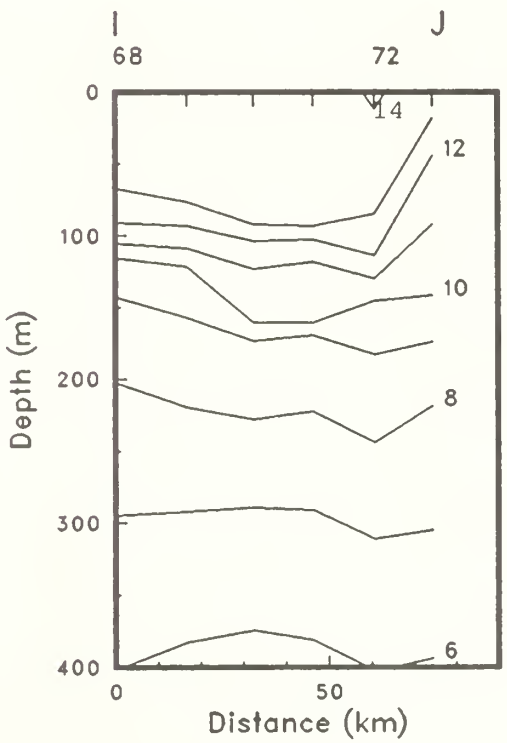

Figure 18(l).

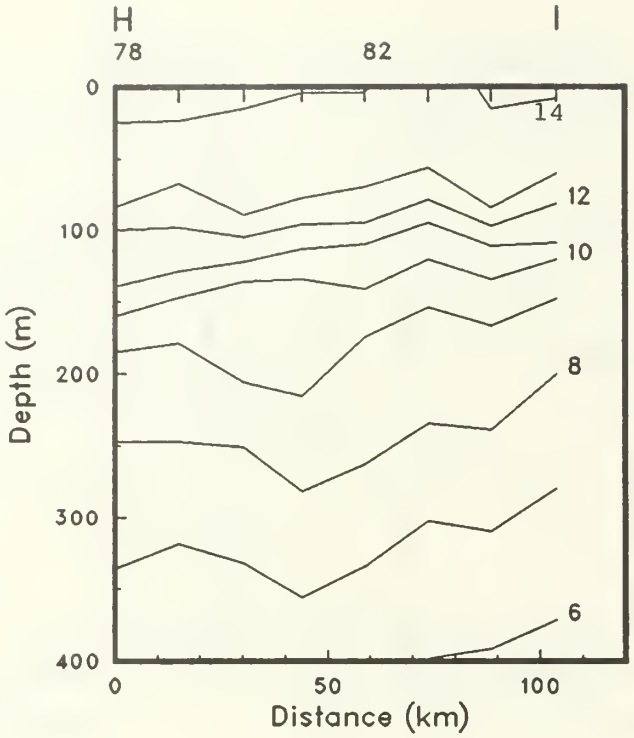

Figure 18(m).

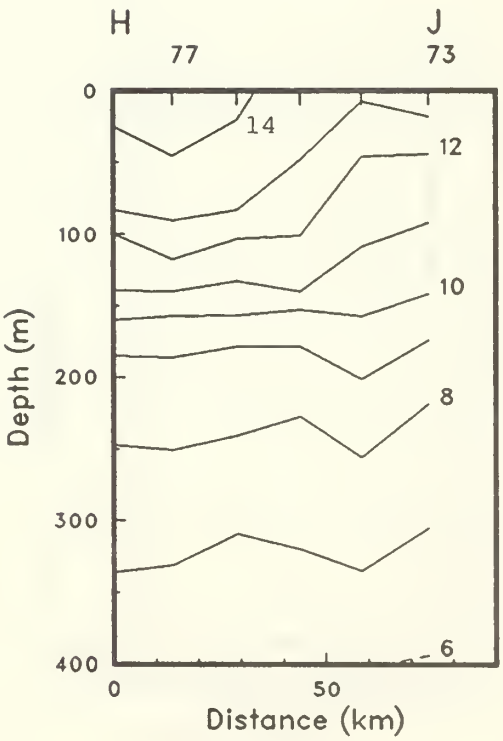

Figure 18(n).

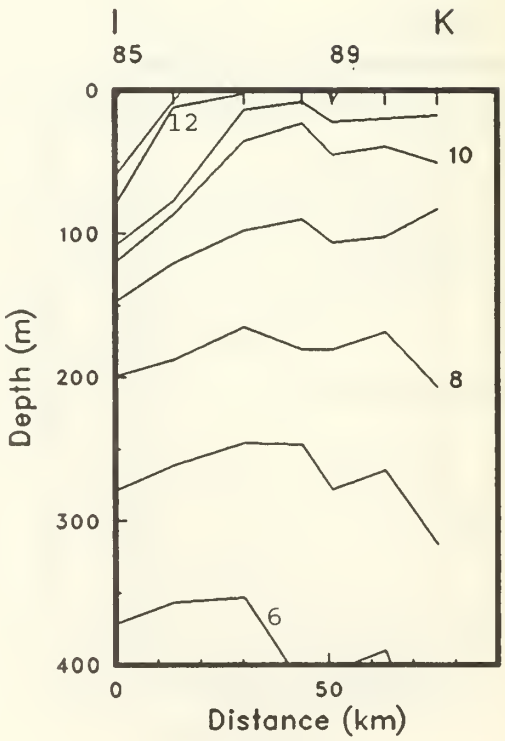

Figure 18(o).

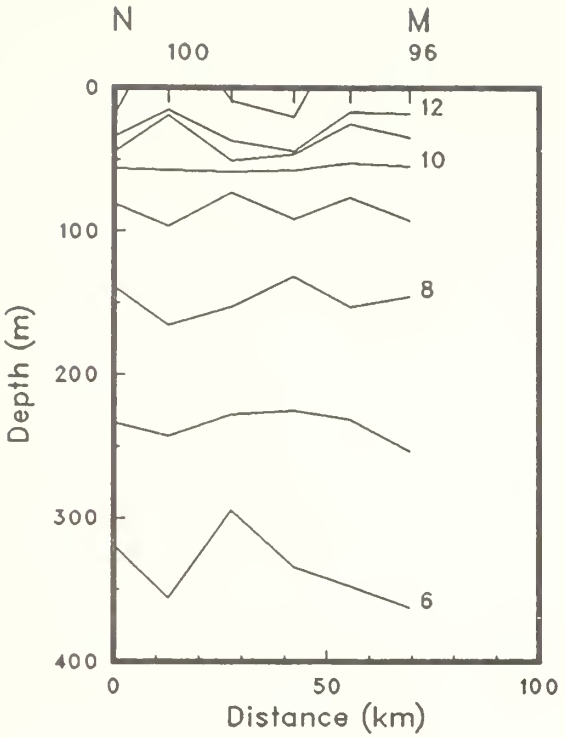

Figure 18(p).

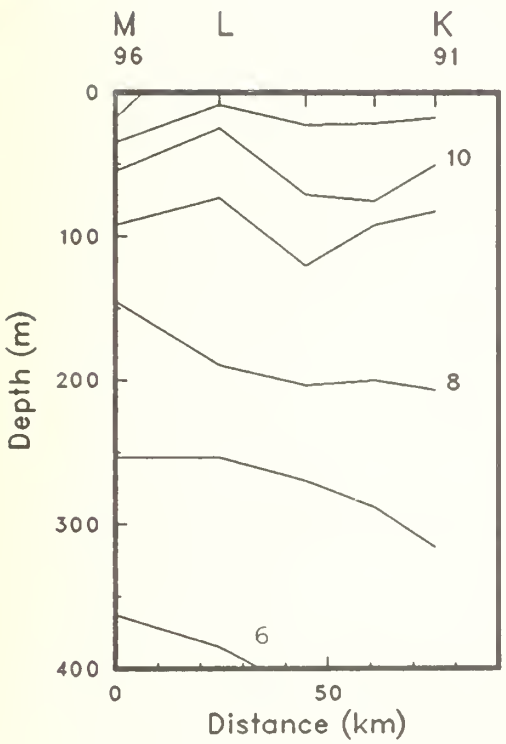

Figure 18(q).

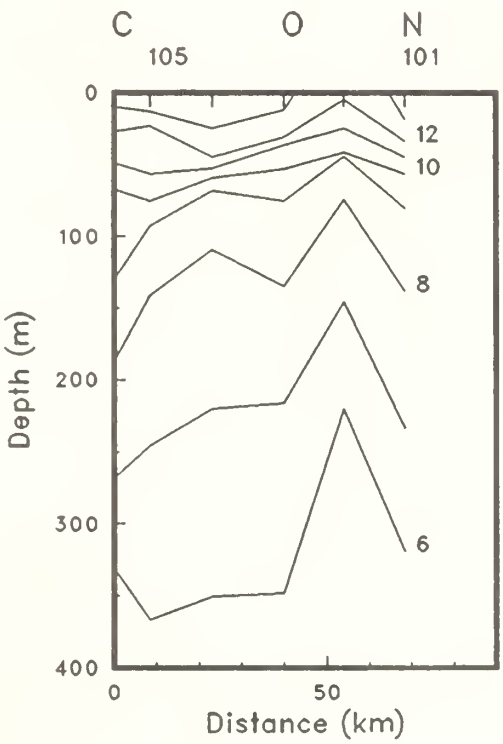

Figure 18(r).

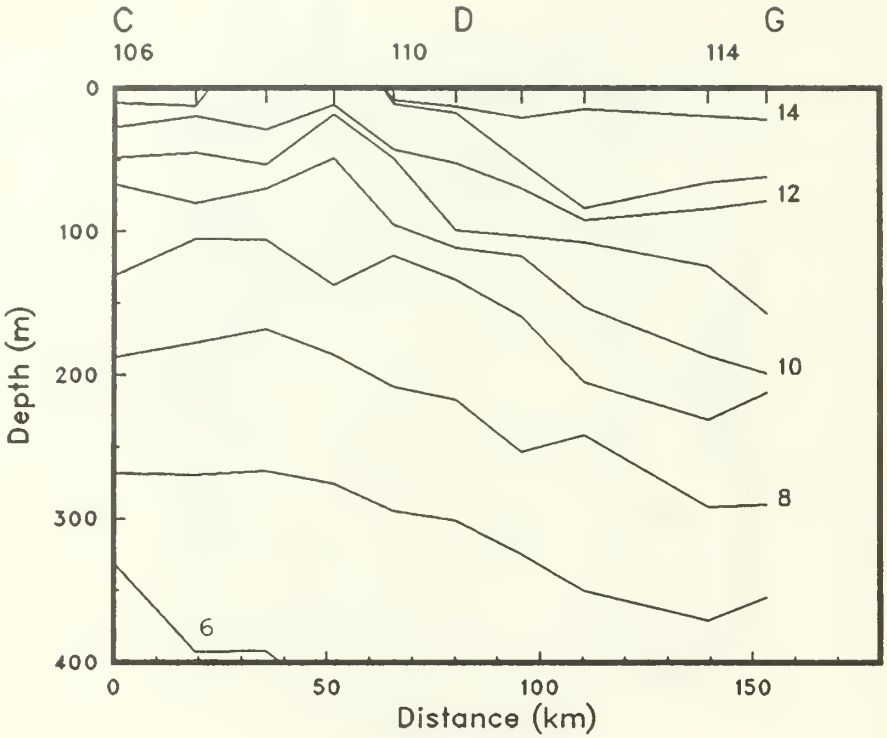

Figure 18(s).

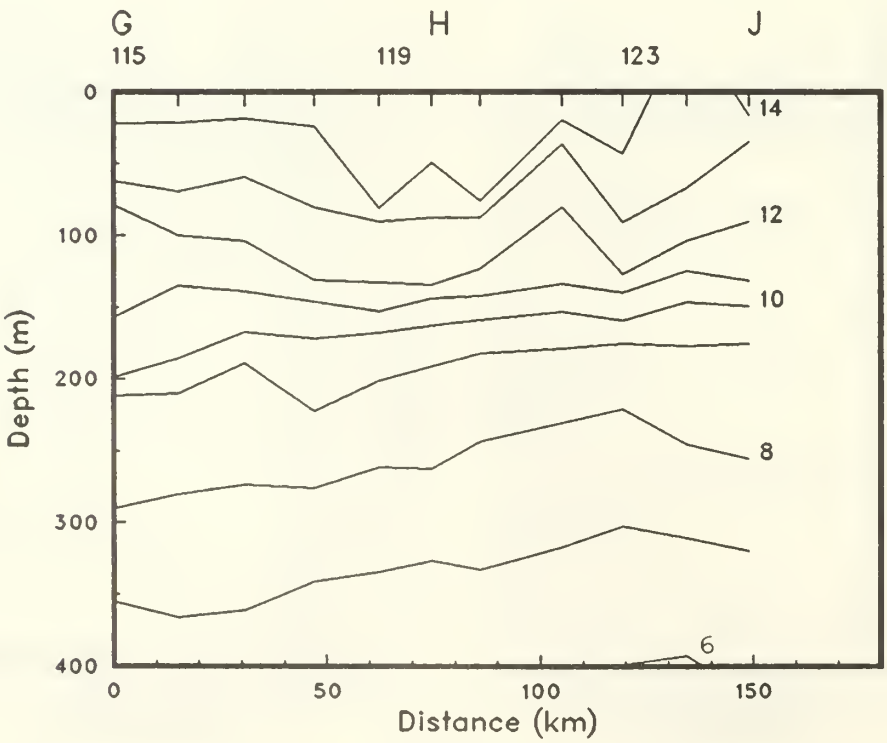

Figure 18(t).

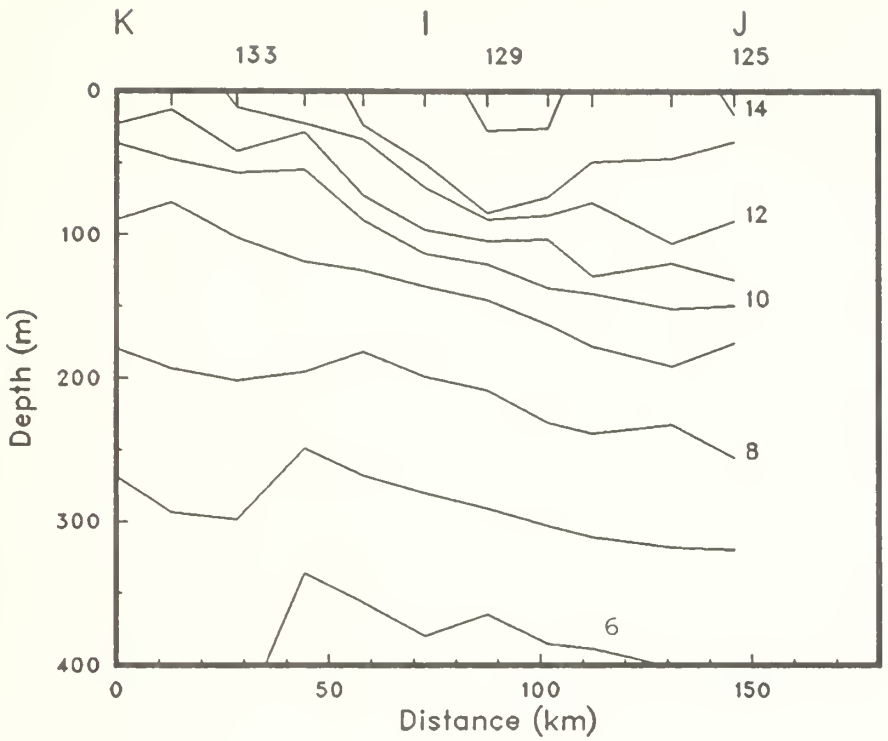
K
I
J
133
129
125
0
100
200
300
400
Depth (m)
14
12
10
8
6
0
50
100
150
Distance (km)

Figure 18(u).

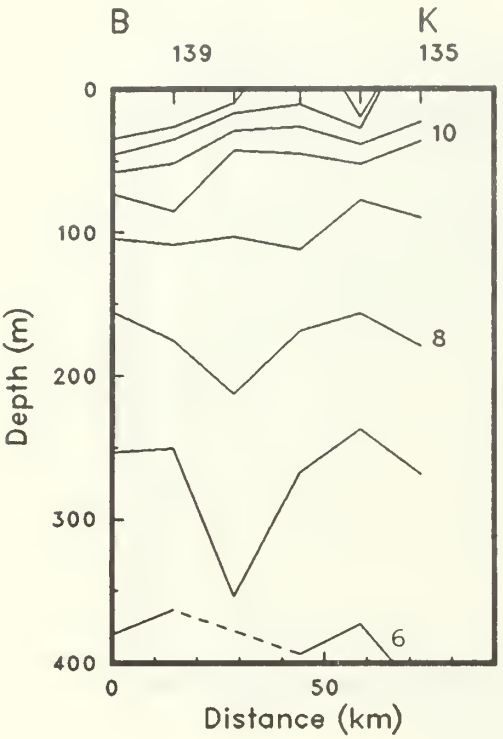

Figure 18(v).

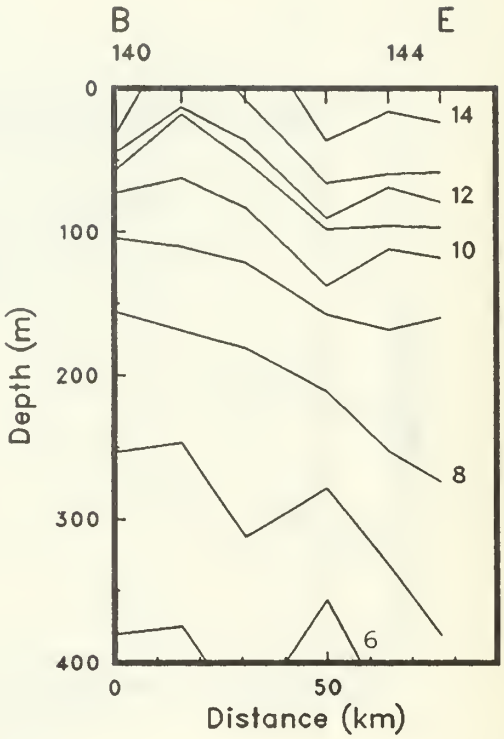

Figure 18(w).

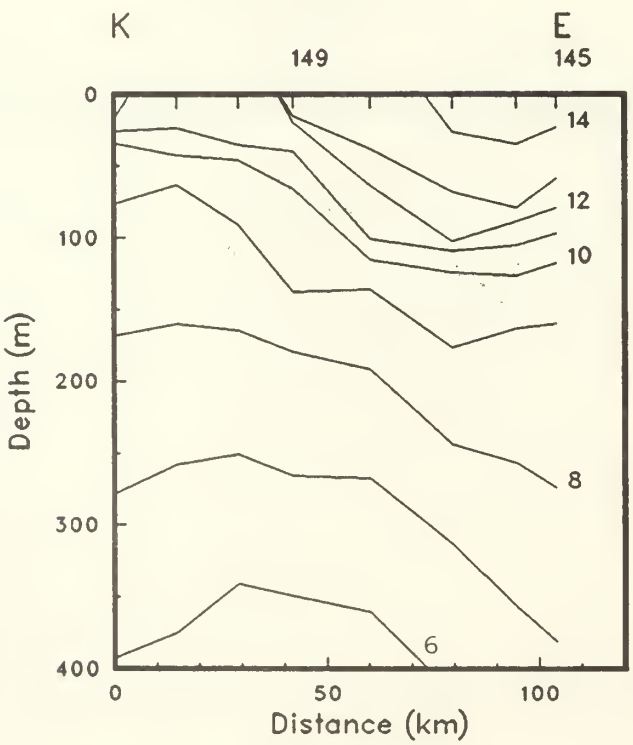

Figure 18(x).

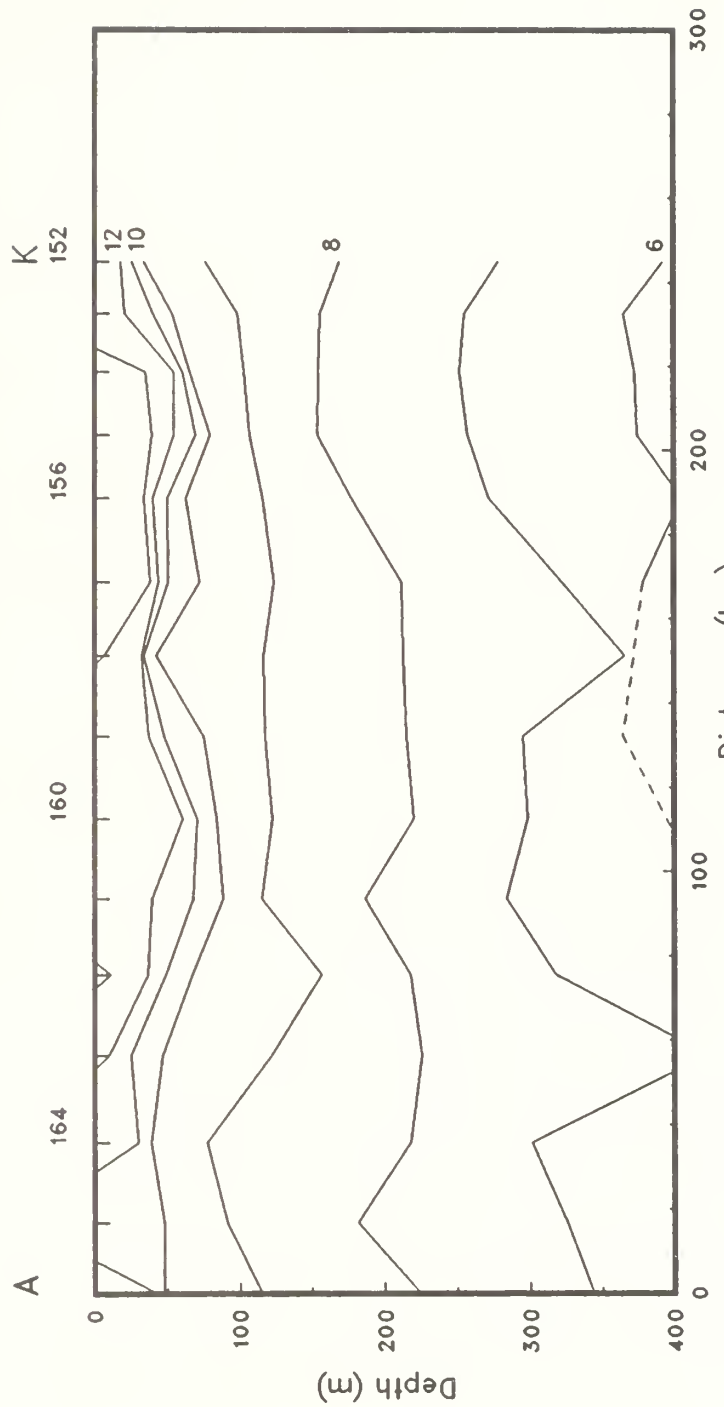
A
164
160
156
K
152
12
10
8
6
0
100
200
300
400
Depth (m)
0
100
200
300
Distance (km)

Figure 18(y).

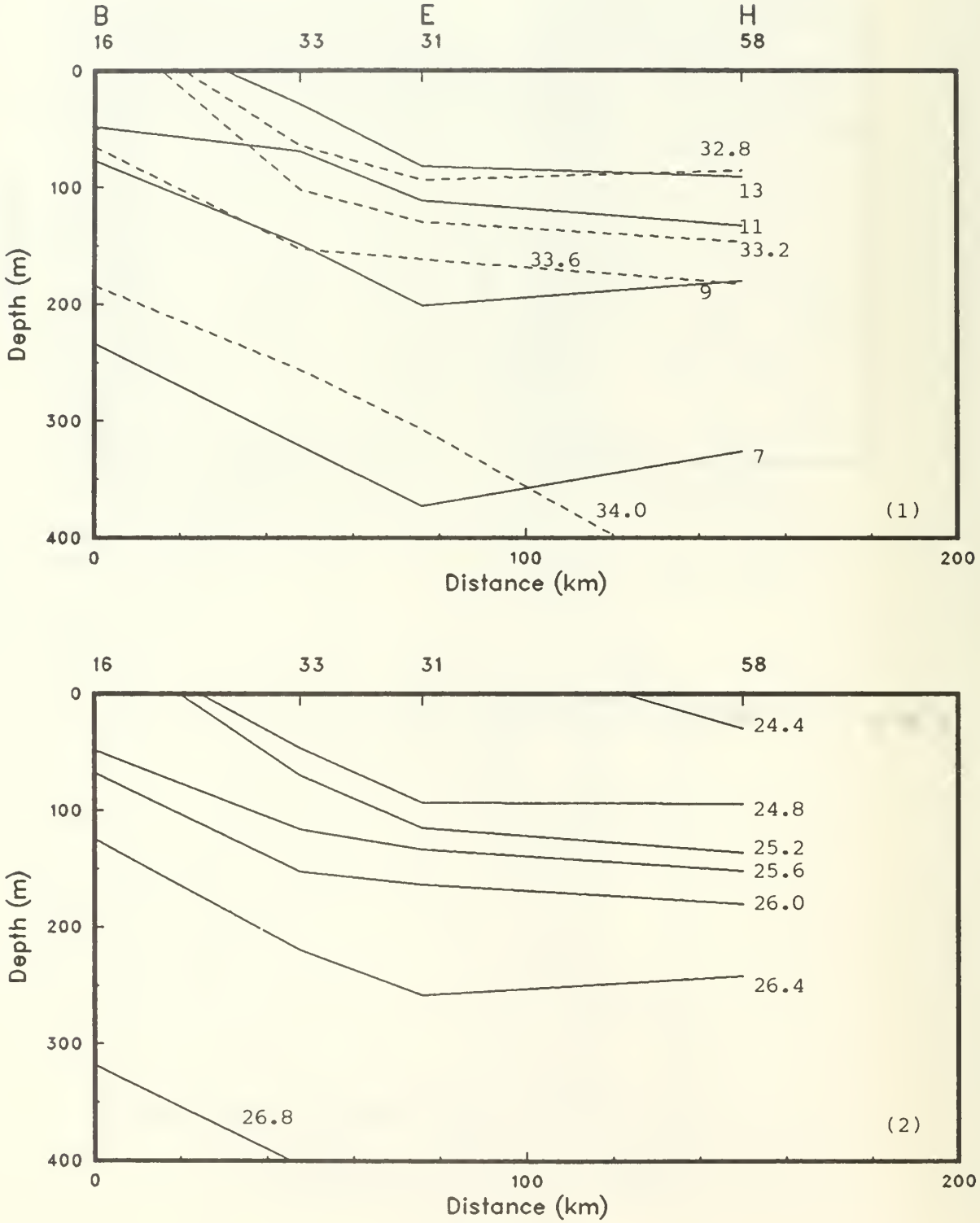

Figure 19(a): Isopleths of (1) temperature and salinity and (2) sigma-t from the CTD's. (OPTOMA11, Leg AII).

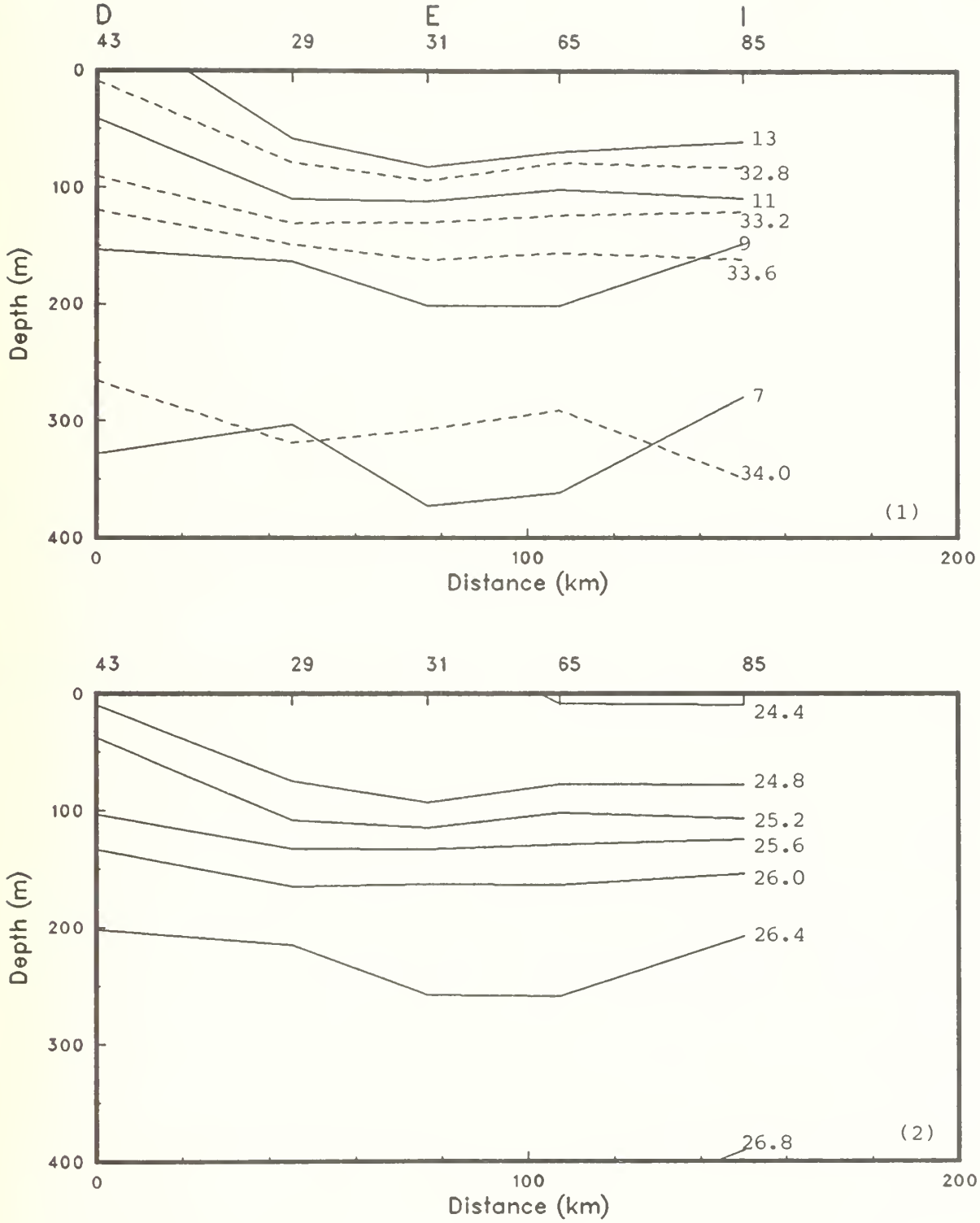
D
E
I
43
29
31
65
85
0
100
200
300
400
Depth (m)
13
32.8
11
33.2
9
33.6
7
34.0
(1)
0
100
200
Distance (km)
43
29
31
65
85
0
100
200
300
400
Depth (m)
24.4
24.8
25.2
25.6
26.0
26.4
26.8
(2)
0
100
200
Distance (km)

Figure 19(b).

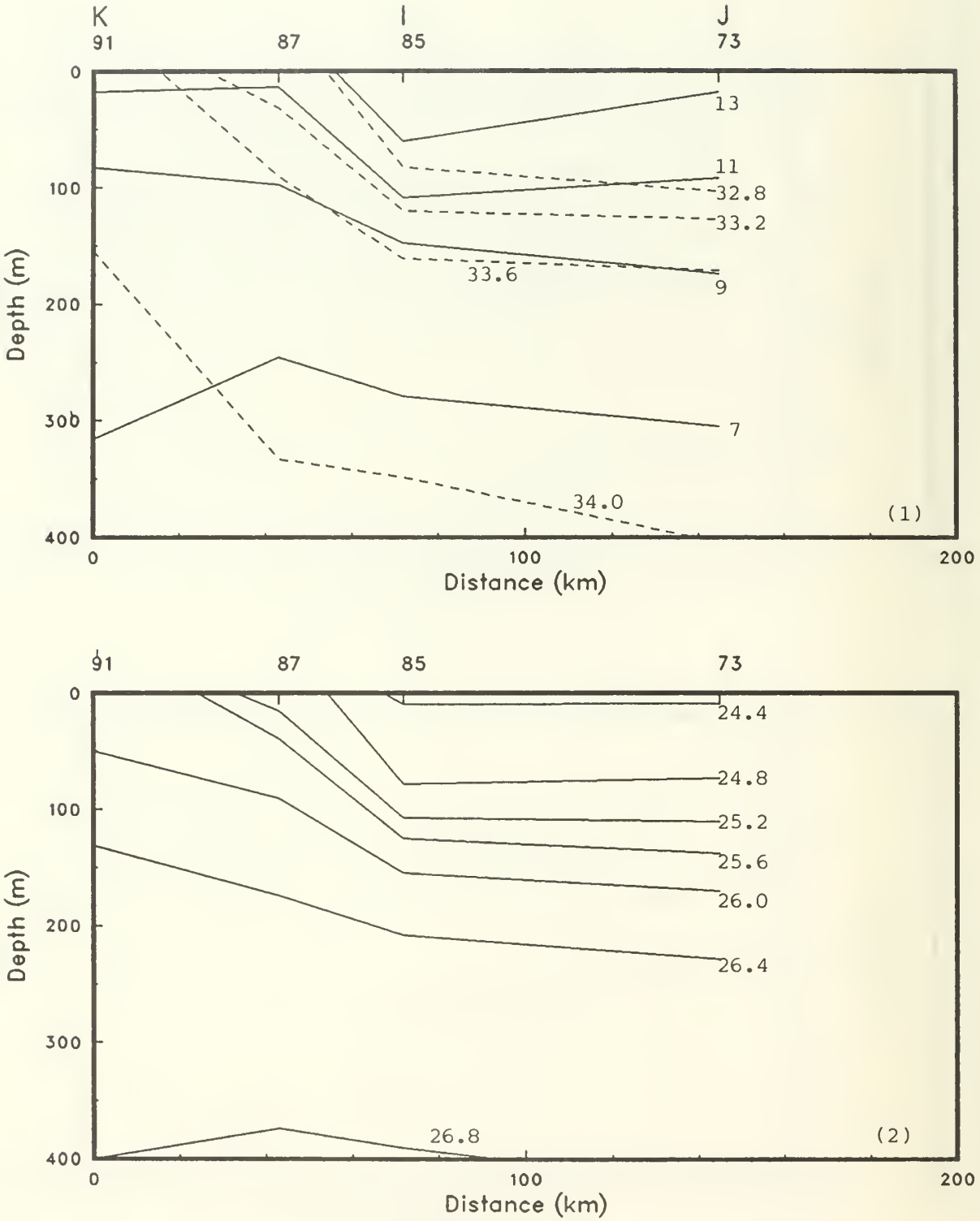
K
91
87
I
85
J
73
0
100
200
300
400
Depth (m)
13
11
32.8
33.2
33.6
9
7
34.0
(1)
0
100
200
Distance (km)
91
87
85
73
0
100
200
300
400
Depth (m)
24.4
24.8
25.2
25.6
26.0
26.4
26.8
(2)
0
100
200
Distance (km)

Figure 19(c).

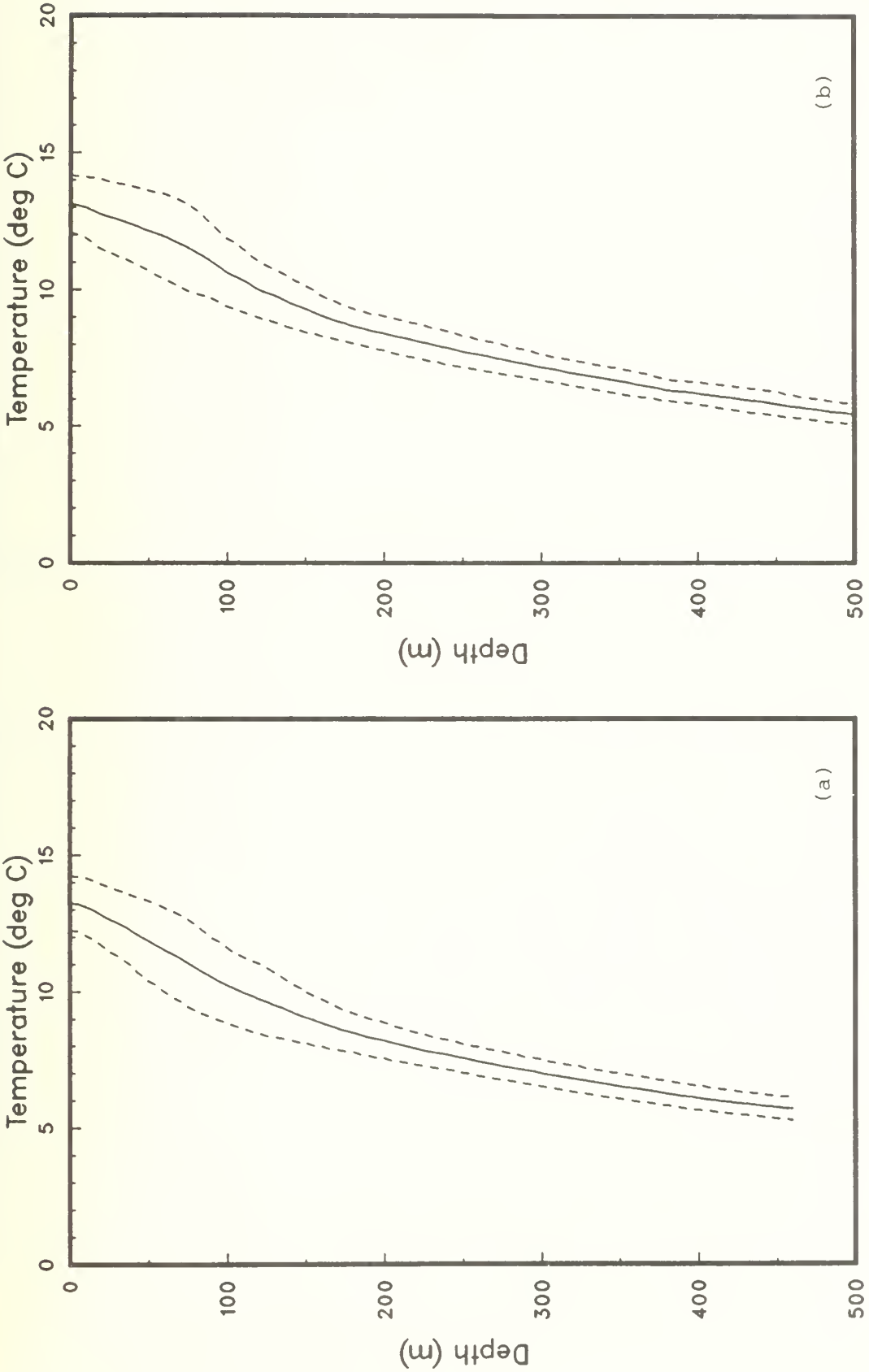

Figure 20: Mean temperature profiles from (a) XBT's and (b) CTD's, with + and - the standard deviation. (OPTOMA11, Leg AII).

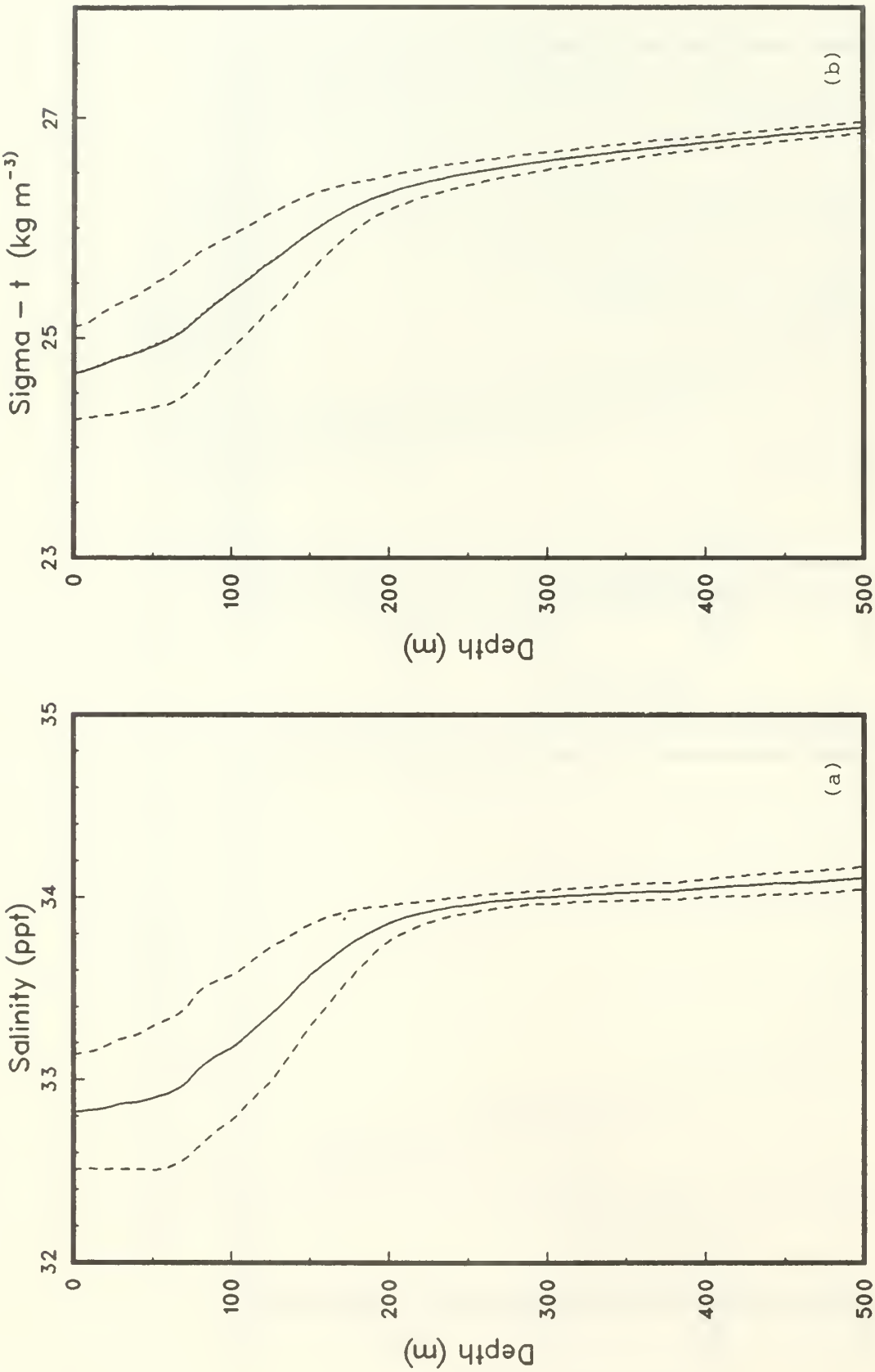

Figure 21: Mean profiles of (a) salinity and (b) sigma-t, with + and - the standard deviations, from the CTD's. (OPTOMA11, Leg AII).

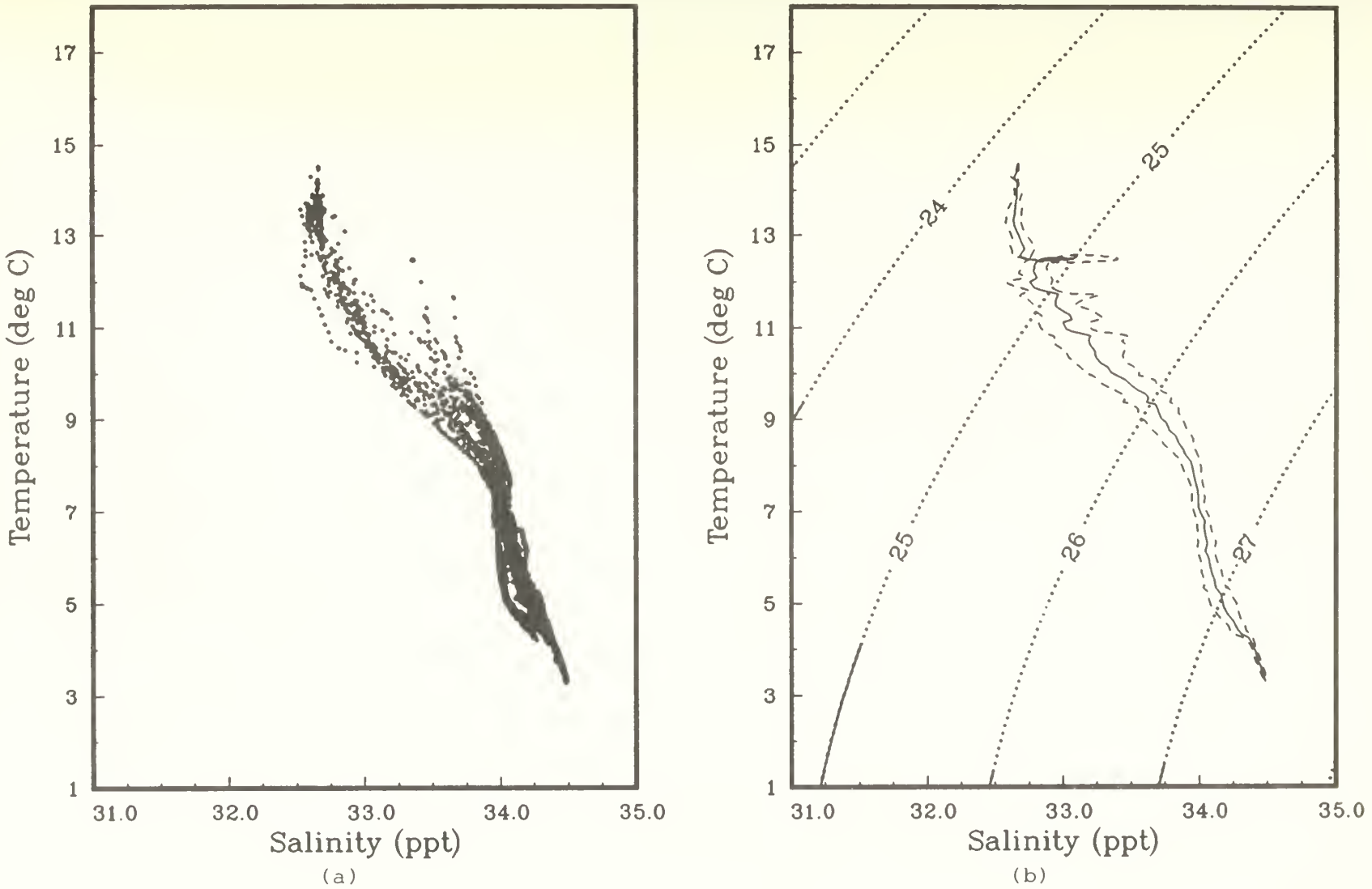

Figure 22: (a) T-S pairs and (b) mean T-S relation, with + and - the standard deviation, from the CTD's. Selected sigma-t contours are also shown. (OPTOMA11, Leg AII).

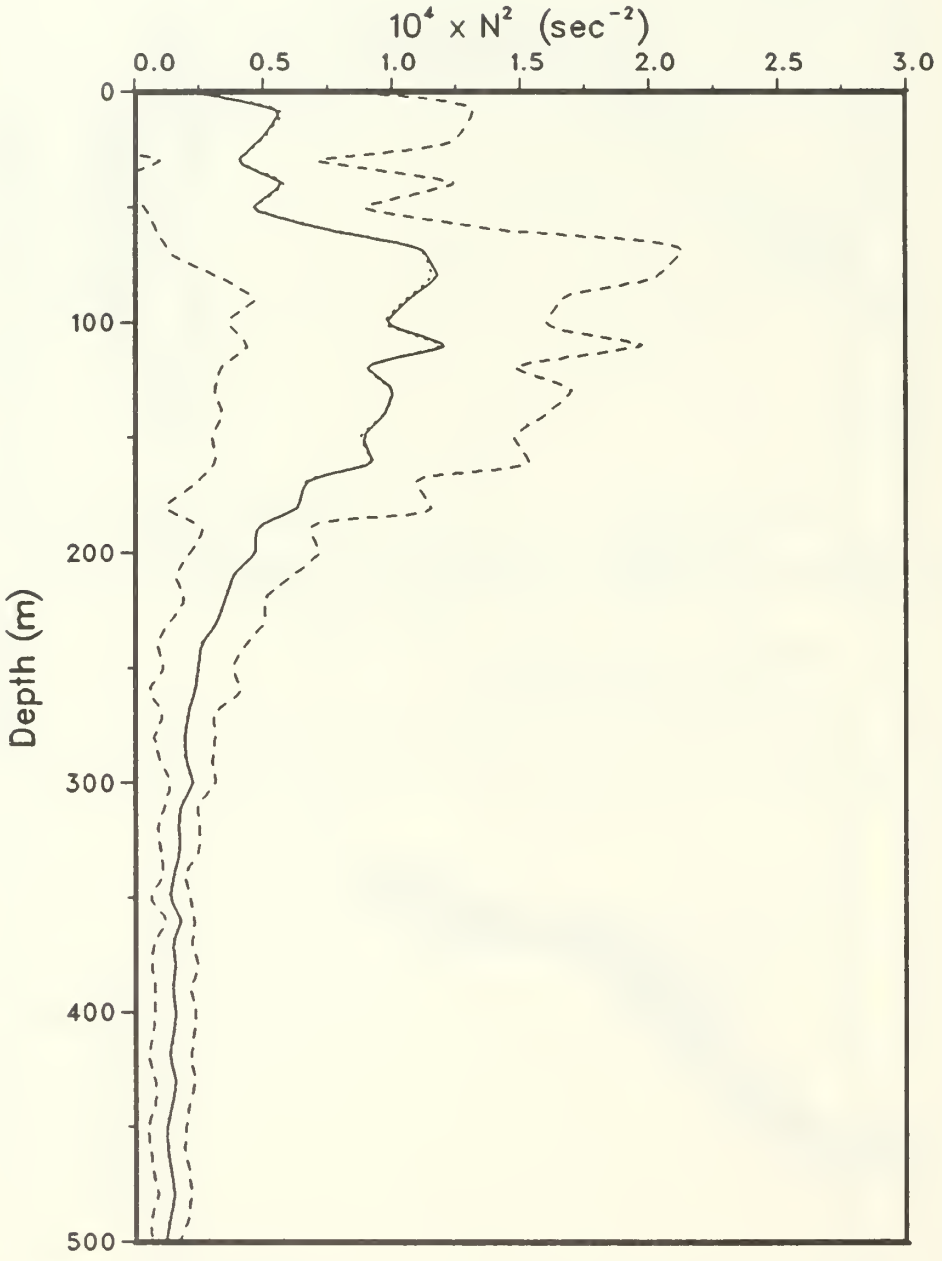

Figure 23: Mean N^2 profile (——), with + and - the standard deviation (----). The N^2 profile from $\overline{T(z)}$ and $\overline{S(z)}$ is also shown (••••). (OPTOMA11, Leg AII).

Section 3

OPTOMA11 Leg AIII

5 - 13 July, 1984

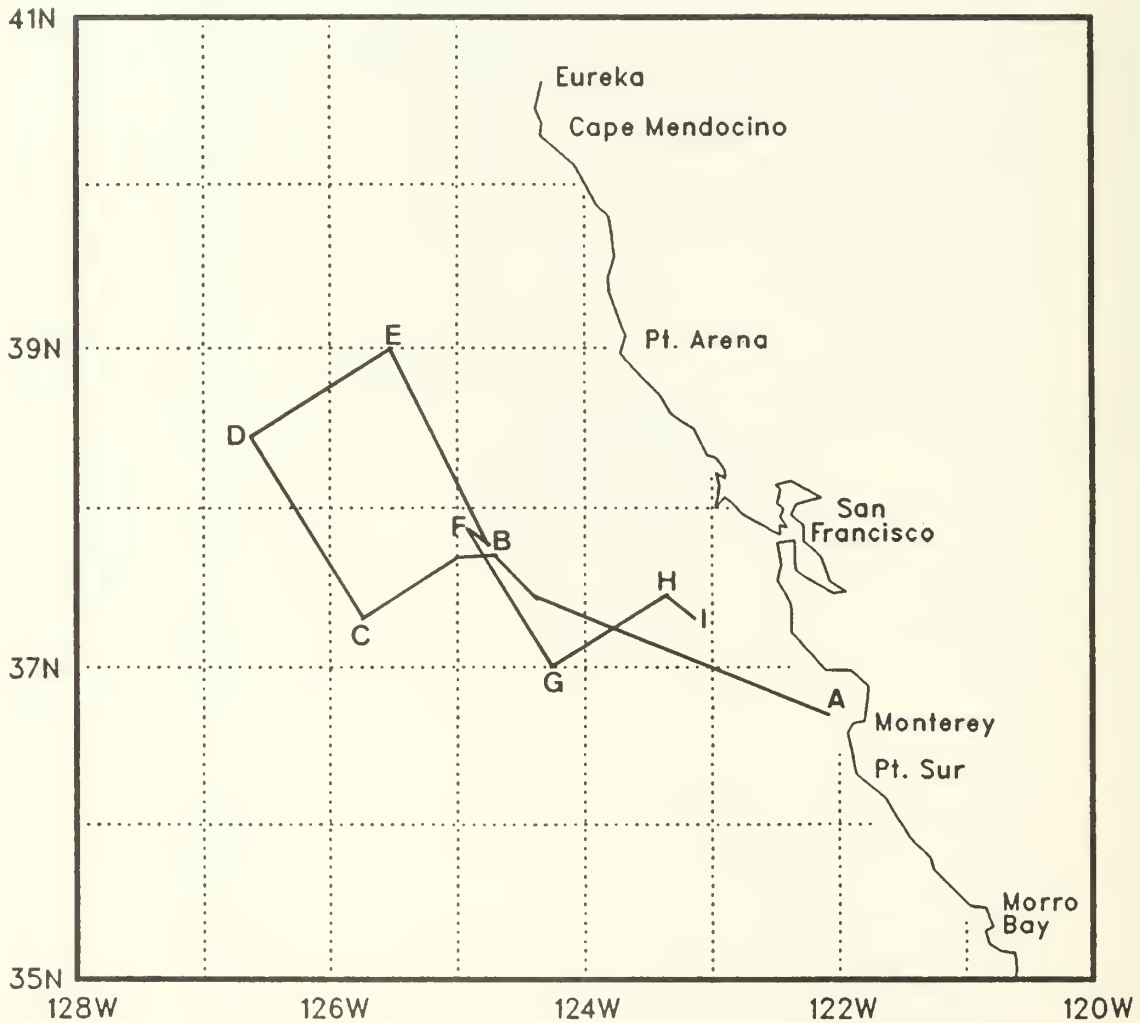

Figure 24: The cruise track for OPTOMA11, Leg AIII.

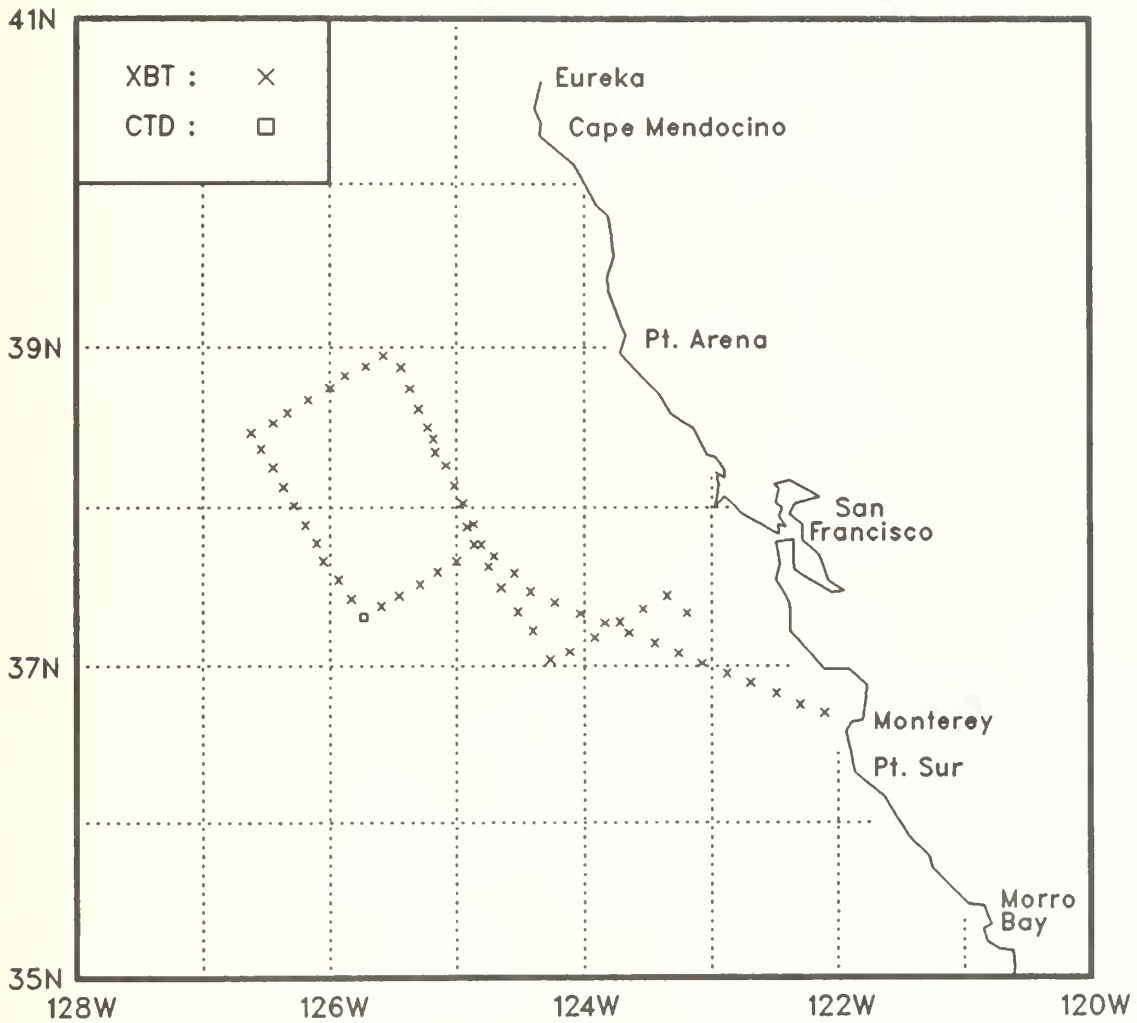

Figure 25: XBT and CTD locations for OPTOMA11, Leg AIII.

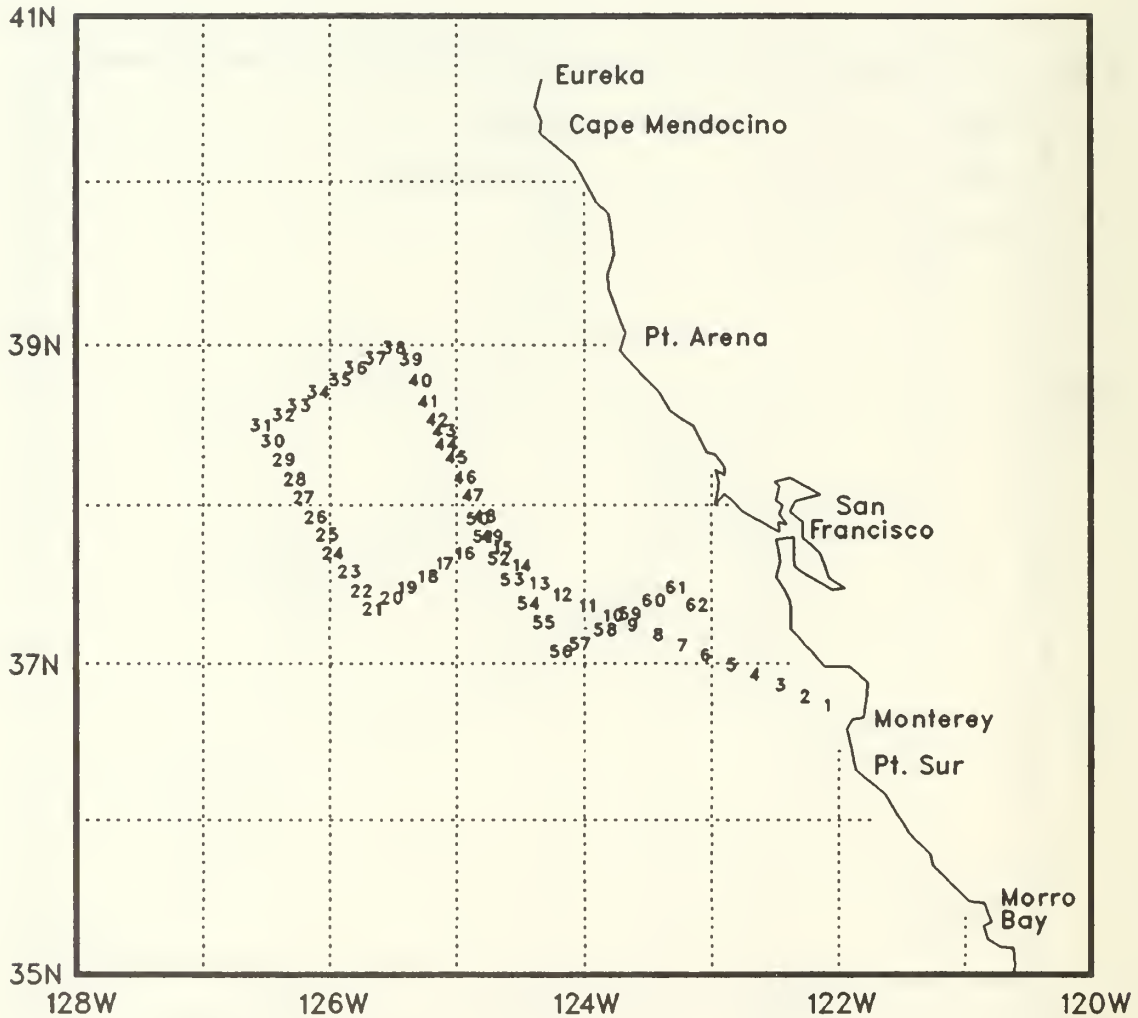

Figure 26: Station numbers for OPTOMA11, Leg AIII.

Table 4: Leg AIII Station Listing

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
1	XBT	84187	1723	36.42	122.06	14.0			
2	XBT	84187	1835	36.46	122.17	14.7			
3	XBT	84187	1949	36.50	122.29	14.6			
4	XBT	84187	2108	36.54	122.41	15.1			
5	XBT	84187	2218	36.58	122.52	14.9			
6	XBT	84187	2336	37.01	123.04	15.0			
7	XBT	84188	49	37.05	123.15	13.9			
8	XBT	84188	201	37.09	123.27	13.9			
9	XBT	84188	318	37.13	123.39	13.7			
10	XBT	84188	435	37.16	123.50	13.6			
11	XBT	84188	603	37.20	124.01	14.5			
12	XBT	84188	741	37.24	124.14	13.9			
13	XBT	84188	1016	37.29	124.25	13.9			
14	XBT	84188	1557	37.35	124.33	13.6			
15	XBT	84188	2221	37.42	124.42	13.7			
16	XBT	84189	1846	37.40	125.00	13.8			
17	XBT	84189	2021	37.36	125.09	14.0			
18	XBT	84189	2201	37.31	125.18	13.9			
19	XBT	84189	2338	37.27	125.27	13.5			
20	XBT	84190	110	37.23	125.36	13.5			
21	CTD	84190	255	37.19	125.44	13.2	33.28	*	*
22	XBT	84190	532	37.26	125.50	13.9			
23	XBT	84190	1055	37.33	125.56	11.8			
24	XBT	84190	1701	37.40	126.03	12.6			
25	XBT	84191	31	37.47	126.06	14.2			
26	XBT	84191	550	37.54	126.12	14.4			
27	XBT	84191	1116	38.01	126.17	14.8			
28	XBT	84191	1607	38.08	126.22	14.6			
29	XBT	84191	2106	38.15	126.27	14.5			
30	XBT	84192	155	38.22	126.32	14.9			
31	XBT	84192	616	38.28	126.37	14.7			
32	XBT	84192	1013	38.32	126.27	14.6			
33	XBT	84192	1443	38.35	126.20	14.8			
34	XBT	84192	1853	38.40	126.10	15.1			
35	XBT	84193	3	38.45	126.00	15.1			
36	XBT	84193	400	38.49	125.53	15.1			
37	XBT	84193	857	38.53	125.43	14.9			
38	XBT	84193	1310	38.57	125.35	14.0			
39	XBT	84193	1803	38.53	125.26	13.9			
40	XBT	84193	1845	38.45	125.22	14.0			
41	XBT	84193	1941	38.37	125.18	13.4			
42	XBT	84193	2036	38.30	125.14	10.9			
43	XBT	84193	2106	38.26	125.11	11.0			
44	XBT	84193	2122	38.21	125.10	10.6			
45	XBT	84193	2227	38.16	125.05	10.7			

* Data not available

STN	TYPE	YR/DAY	GMT	LAT (NORTH) DD.MM	LONG (WEST) DDD.MM	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
46	XBT	84193	2333	38.08	125.01	12.6			
47	XBT	84194	34	38.02	124.57	12.8			
48	XBT	84194	140	37.54	124.52	13.3			
49	XBT	84194	247	37.46	124.48	13.5			
50	XBT	84194	910	37.53	124.55	13.3			
51	XBT	84194	1759	37.46	124.52	13.3			
52	XBT	84194	1928	37.38	124.45	13.6			
53	XBT	84194	2058	37.30	124.39	13.6			
54	XBT	84194	2235	37.21	124.31	13.1			
55	XBT	84194	2358	37.14	124.24	13.0			
56	XBT	84195	200	37.03	124.16	13.5			
57	XBT	84195	346	37.05	124.07	13.6			
58	XBT	84195	609	37.11	123.55	13.1			
59	XBT	84195	815	37.17	123.43	12.8			
60	XBT	84195	1018	37.22	123.32	12.8			
61	XBT	84195	1209	37.27	123.21	13.8			
62	XBT	84195	1331	37.20	123.11	12.9			

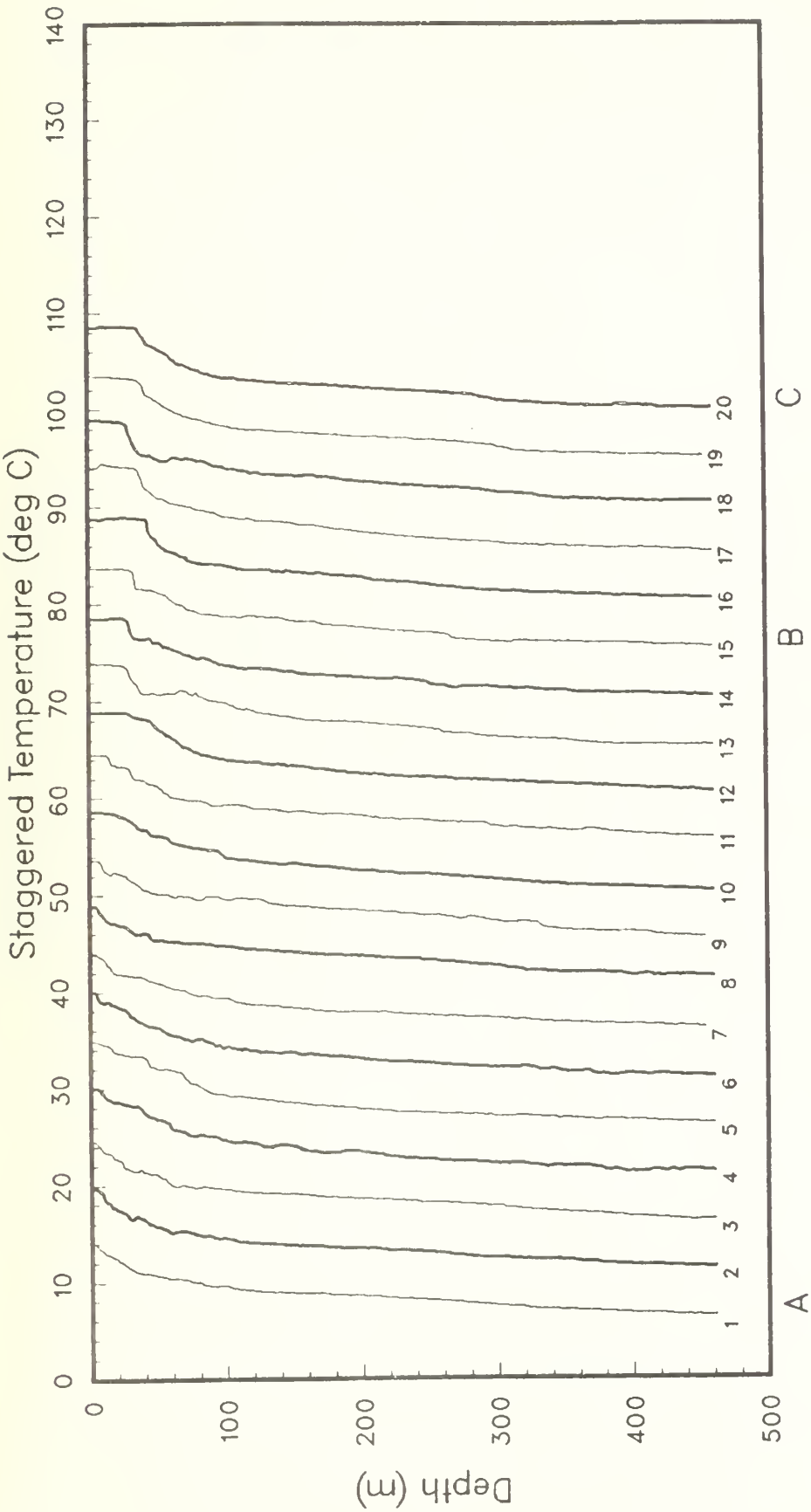

Figure 27(a): XBT temperature profiles, staggered by multiples of 5C. (OPTOMA11, Leg AIII).

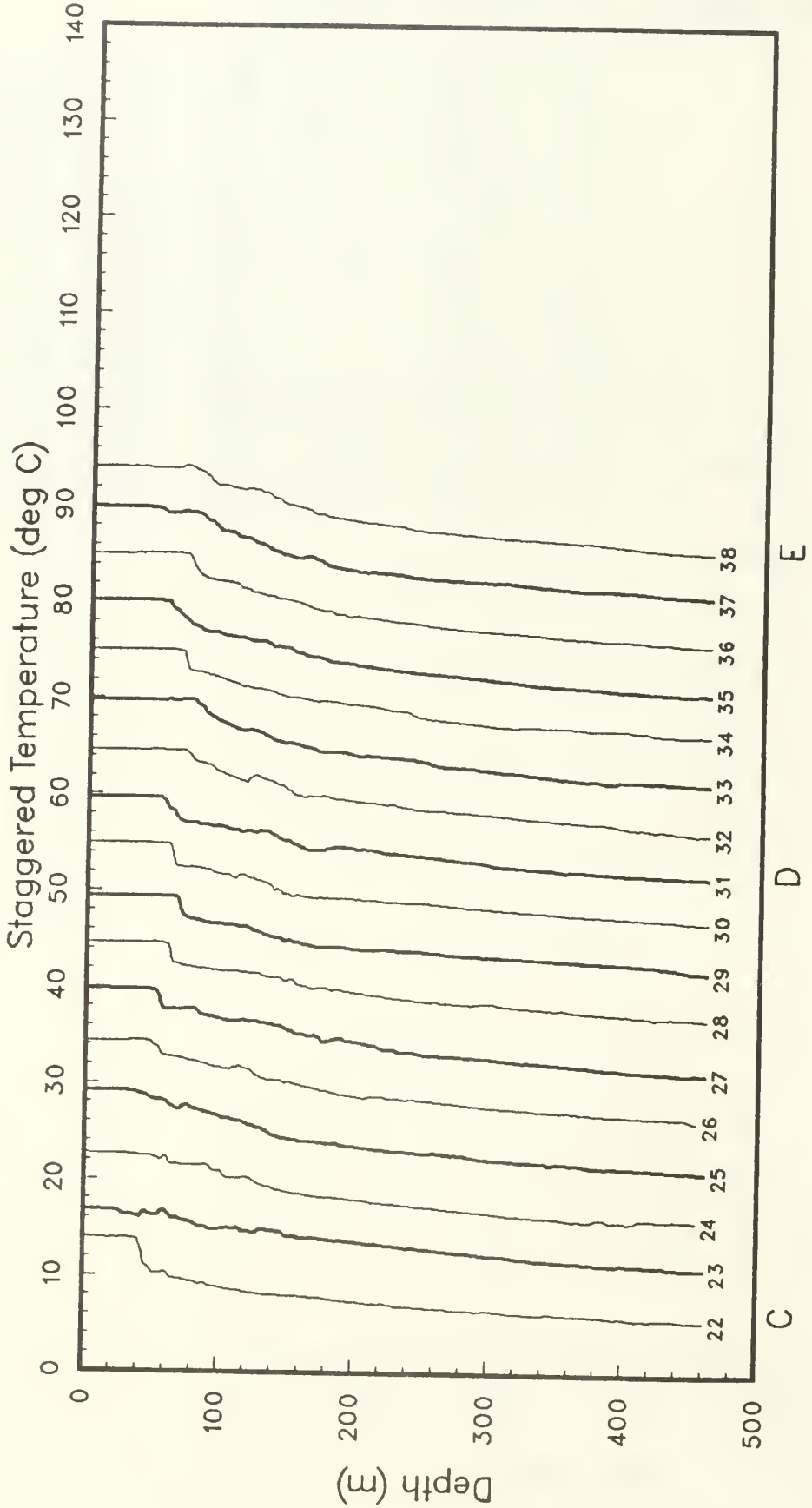
Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
Depth (m)
0
100
200
300
400
500
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
C
D
E

Figure 27(b).

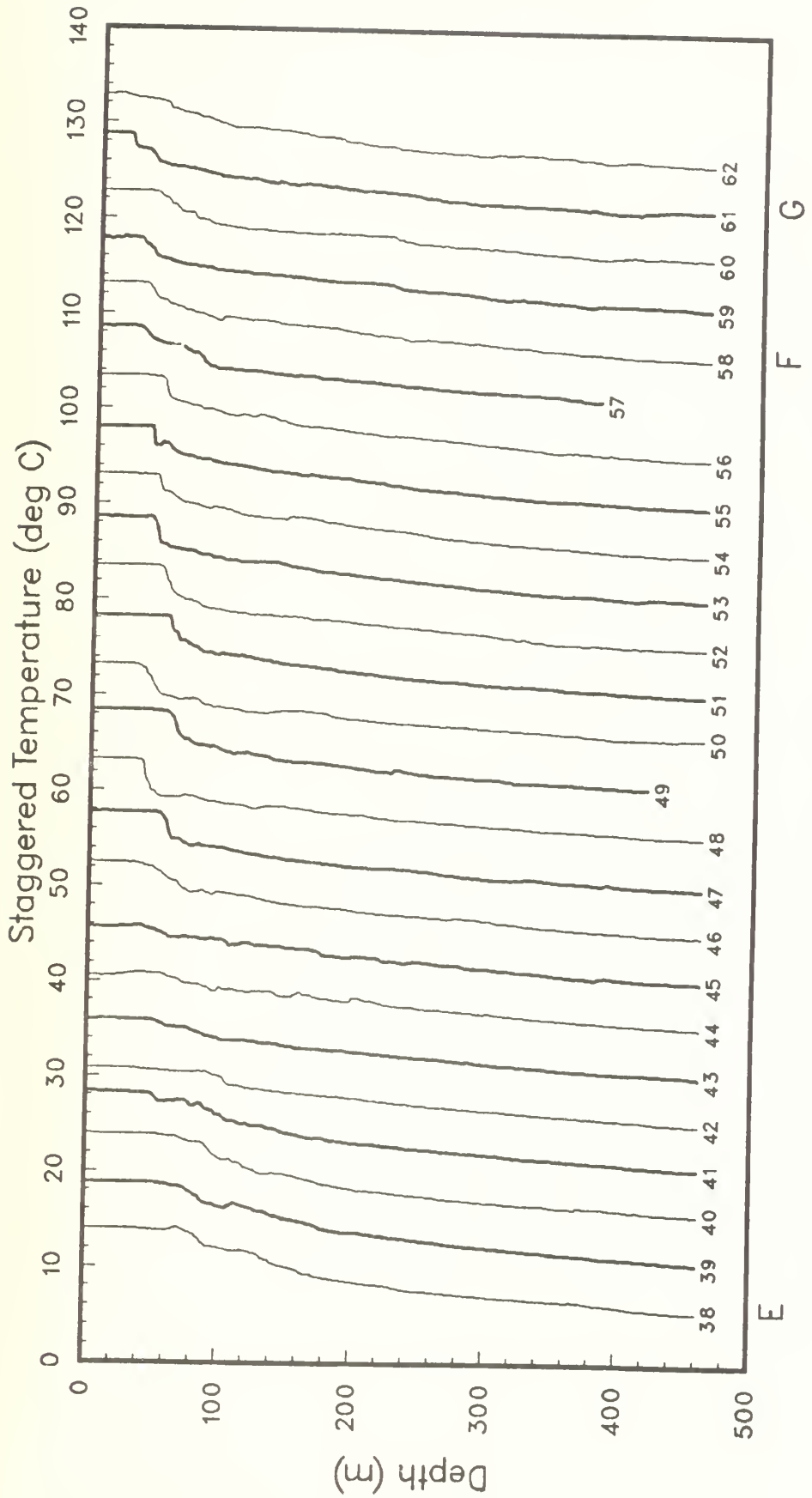
Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
Depth (m)
0
100
200
300
400
500
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
E
F
G

Figure 27(c).

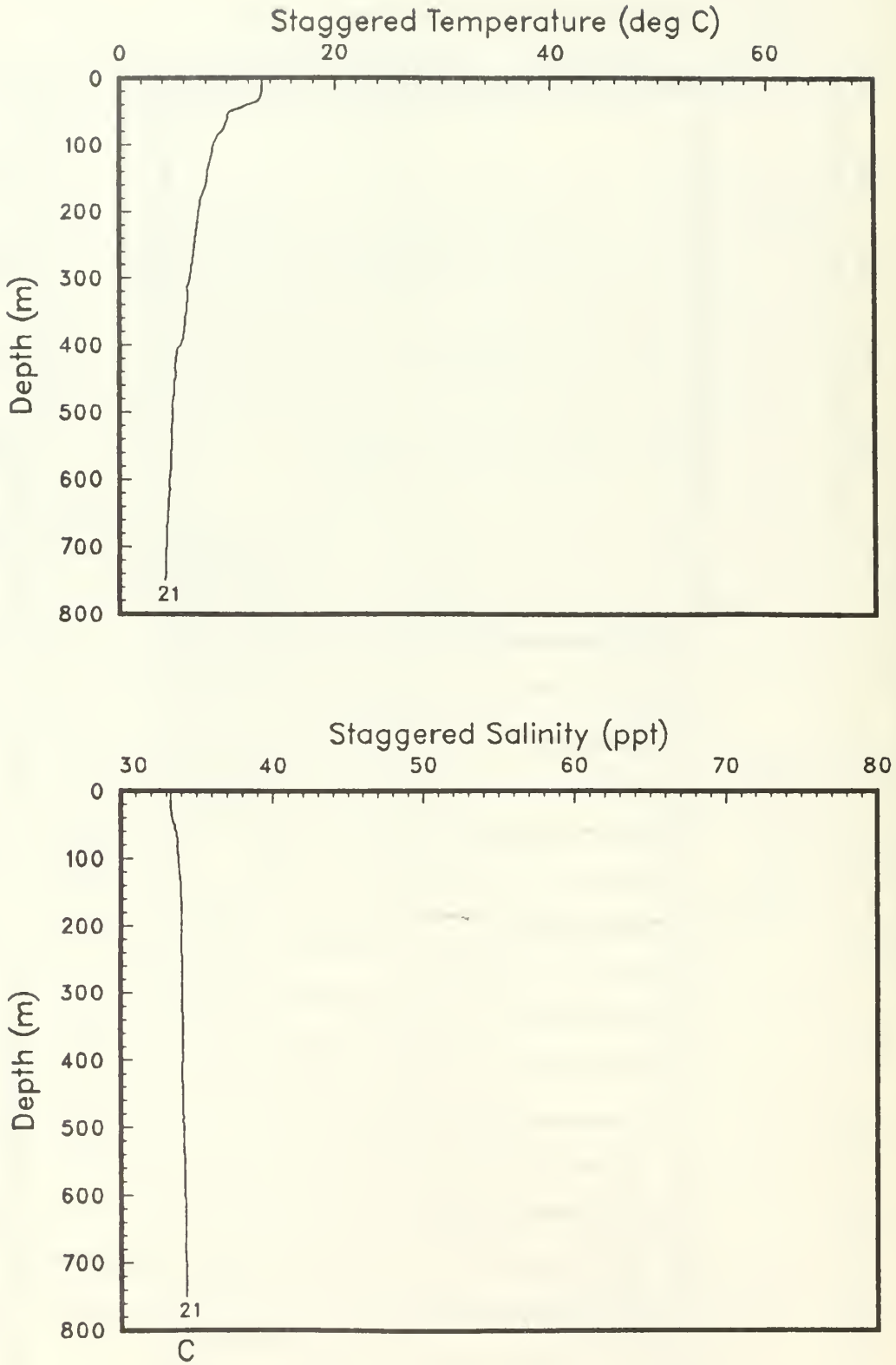

Figure 28: CTD temperature and salinity profiles. (OPTOMA11, Leg AIII).

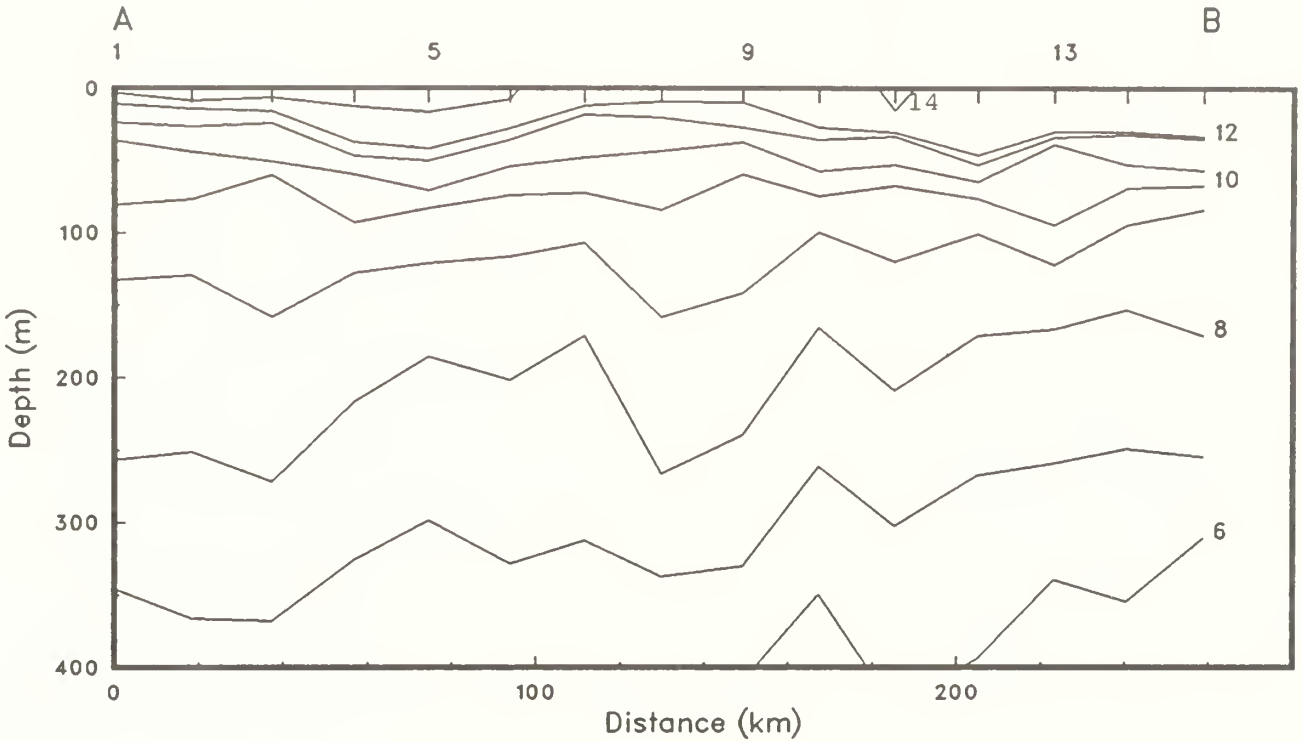

Figure 29(a): Along-track isotherms. Tick marks along the upper horizontal axis show station positions. Some station numbers are given. Dashed lines are used if the cast was too shallow. (OPTOMA11, Leg AIII).

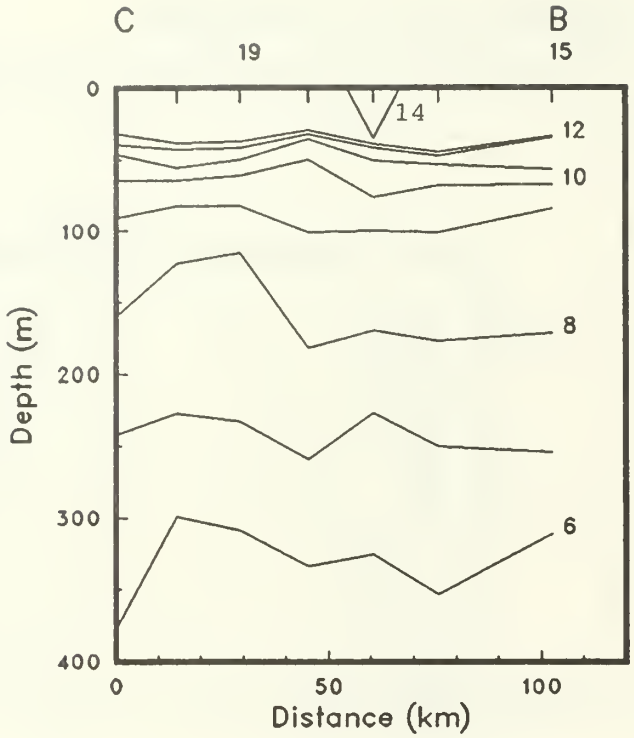

Figure 29(b).

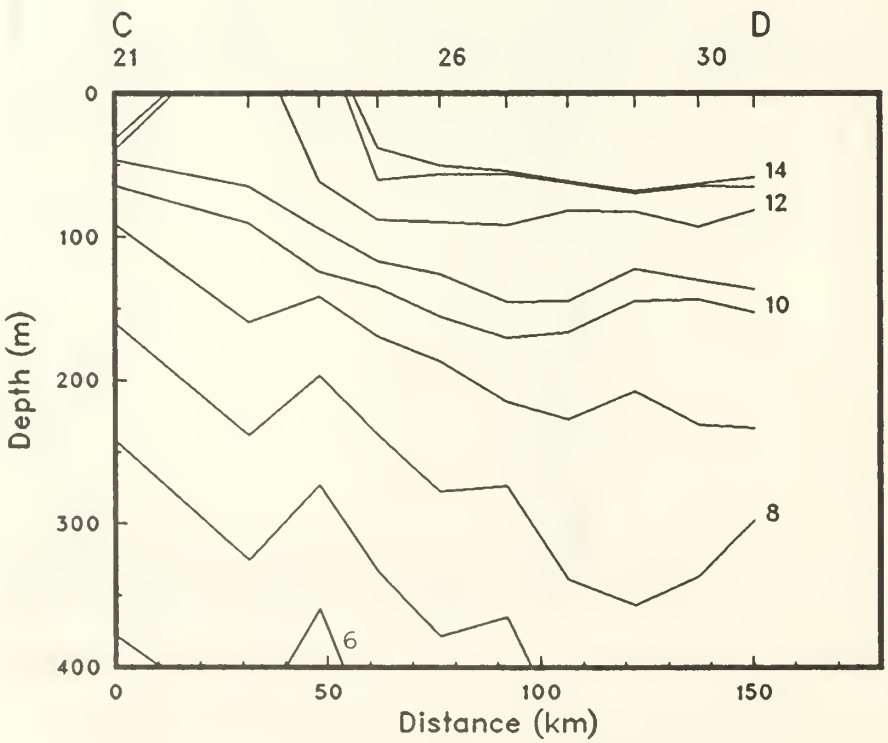

Figure 29(c).

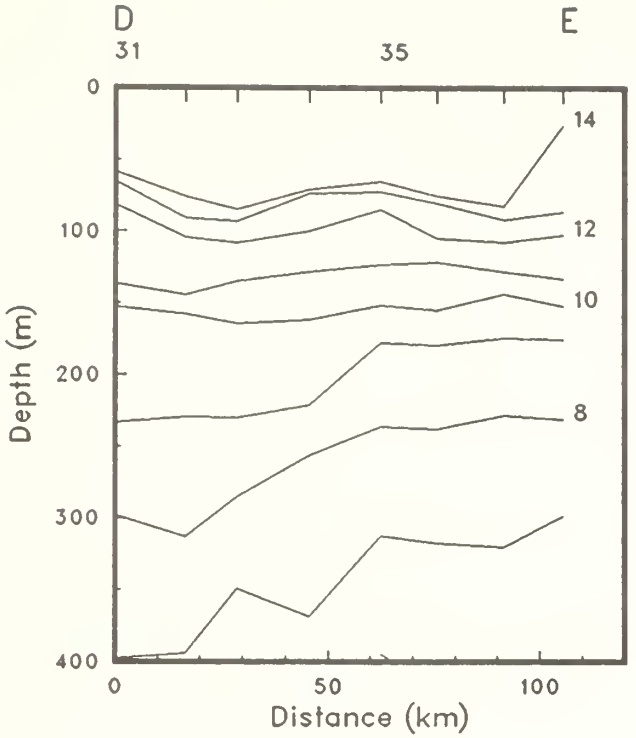

Figure 29(d).

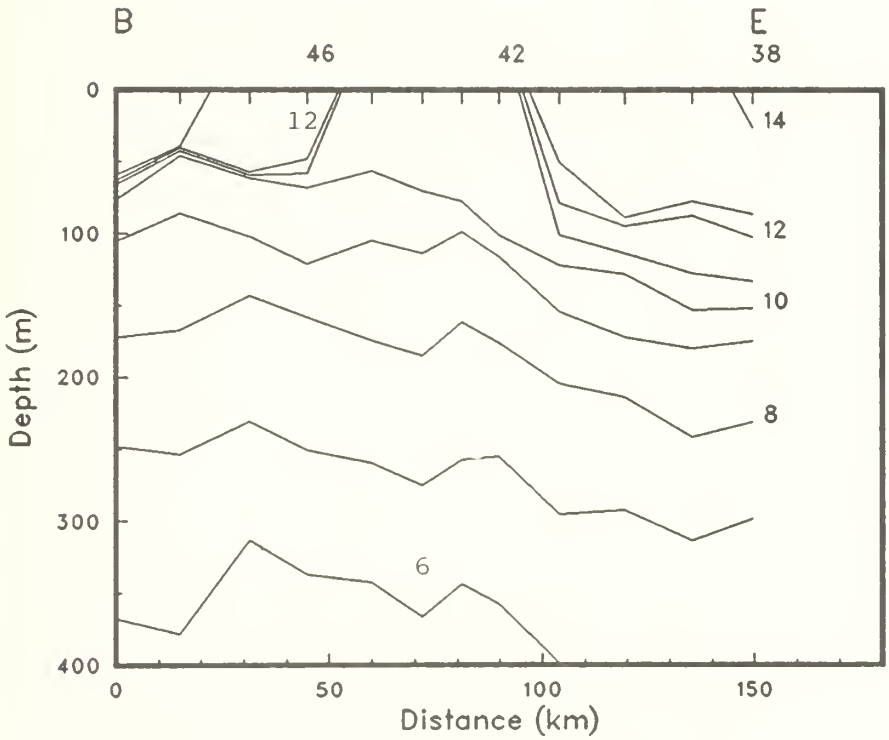

Figure 29(e).

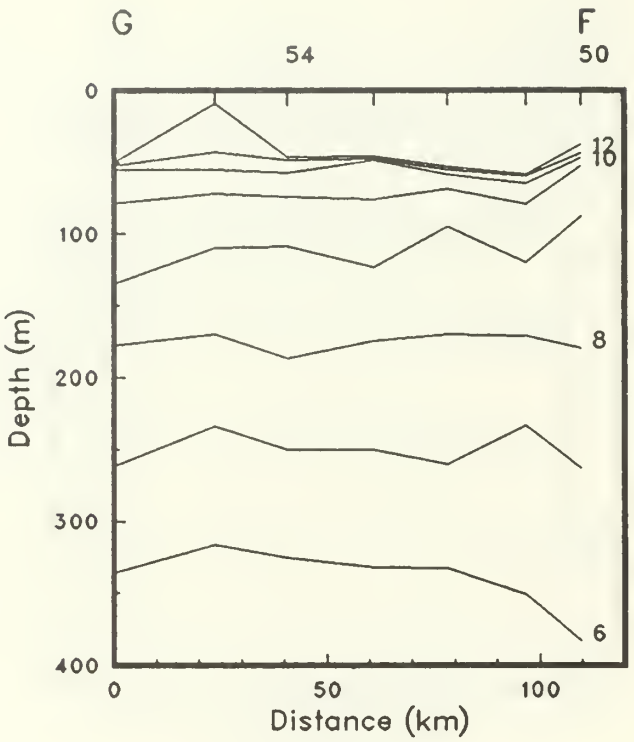

Figure 29(f).

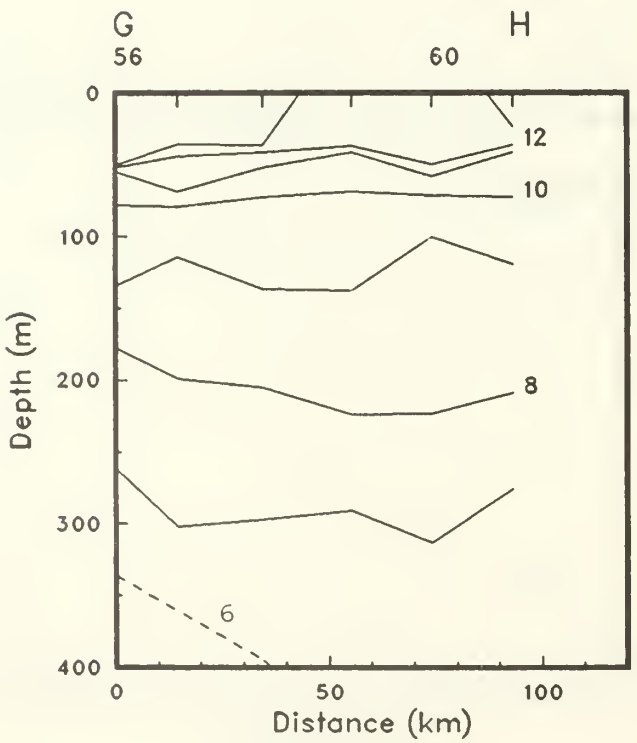

Figure 29(g).

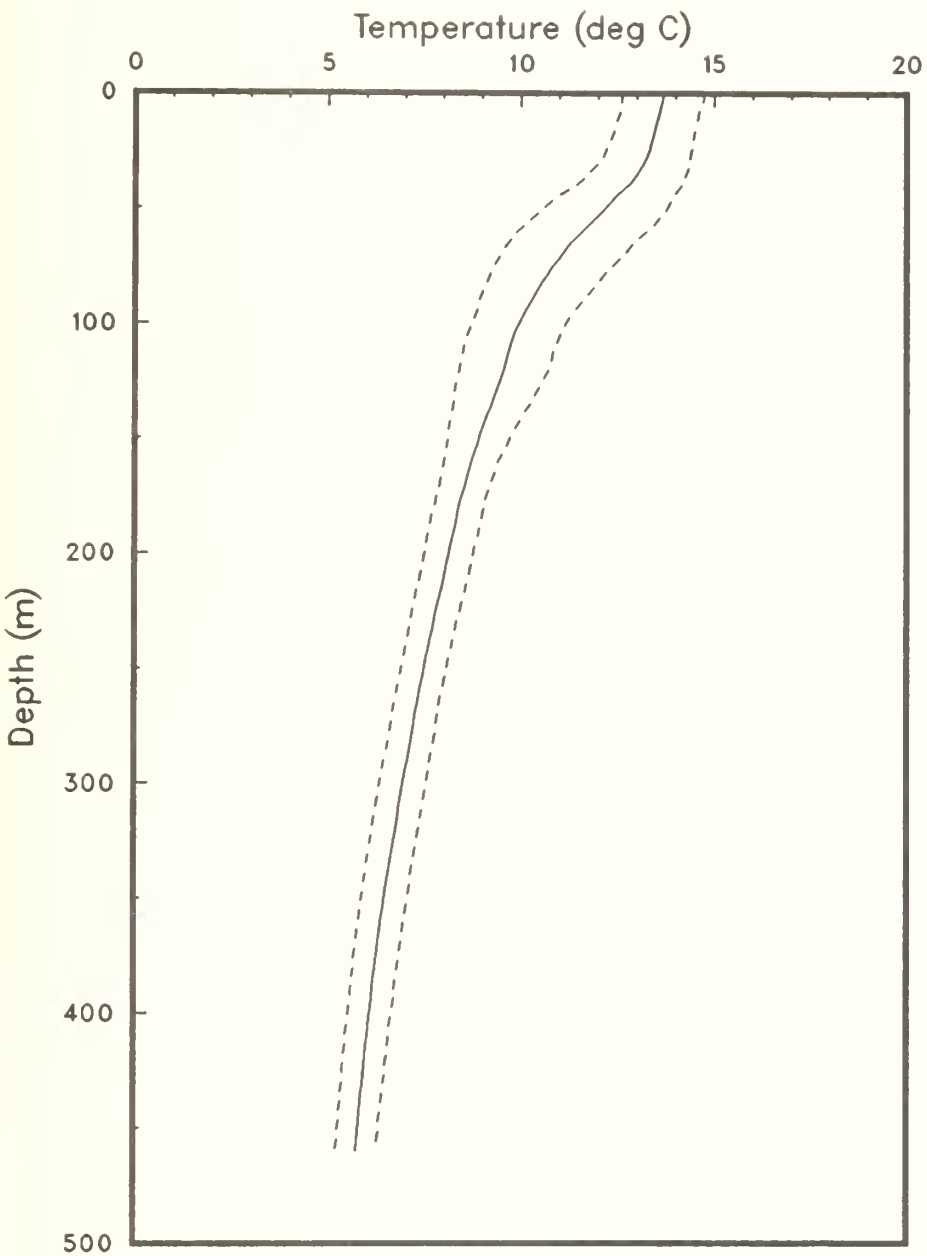

Figure 30: Mean temperature profile, with + and - the standard deviation. (OPTOMA11, Leg AIII).

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Section 4
OPTOMA11 Leg DI
23 - 30 June 1984

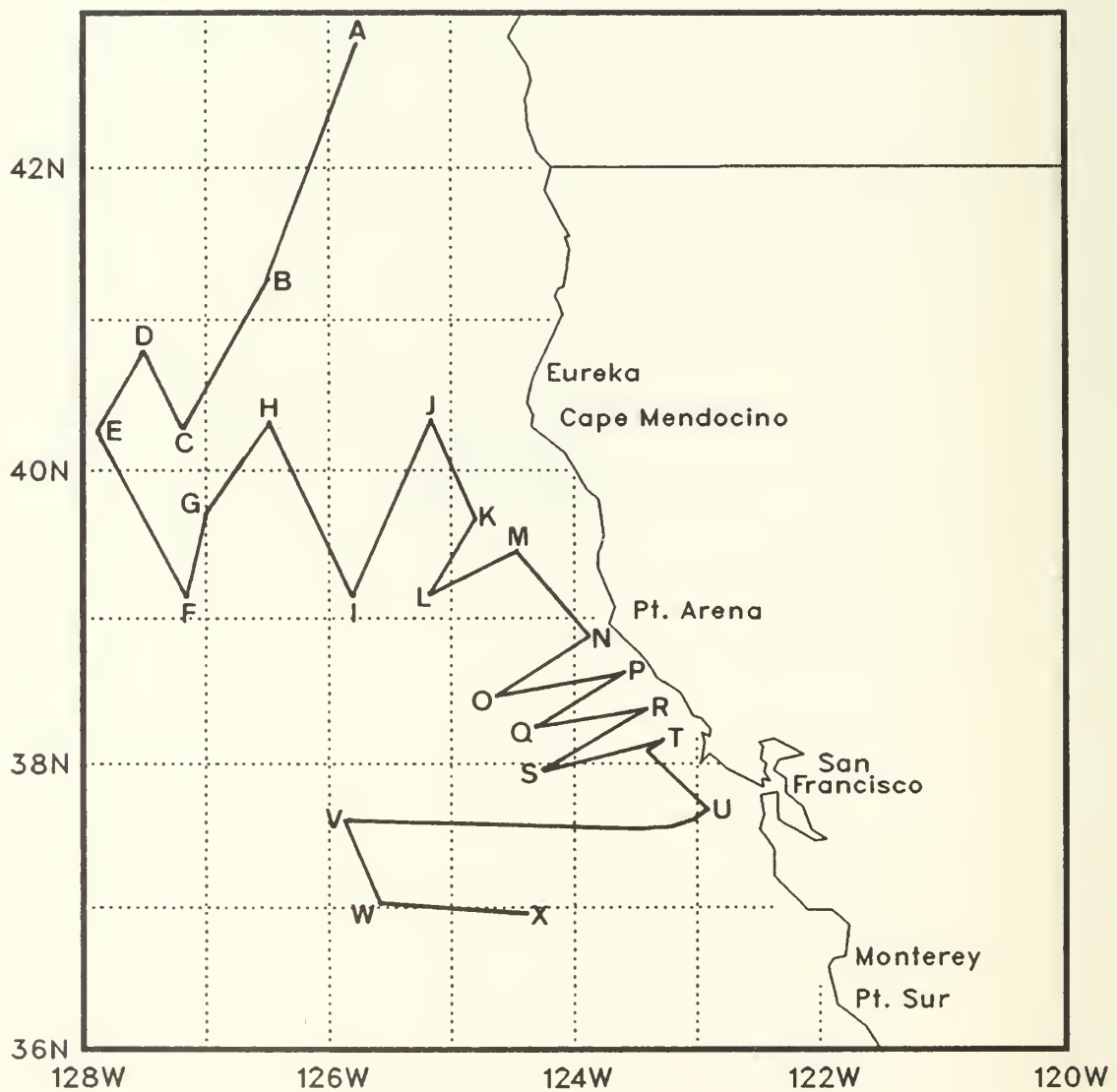


Figure 31: The cruise track for OPTOMA11, Leg DI.

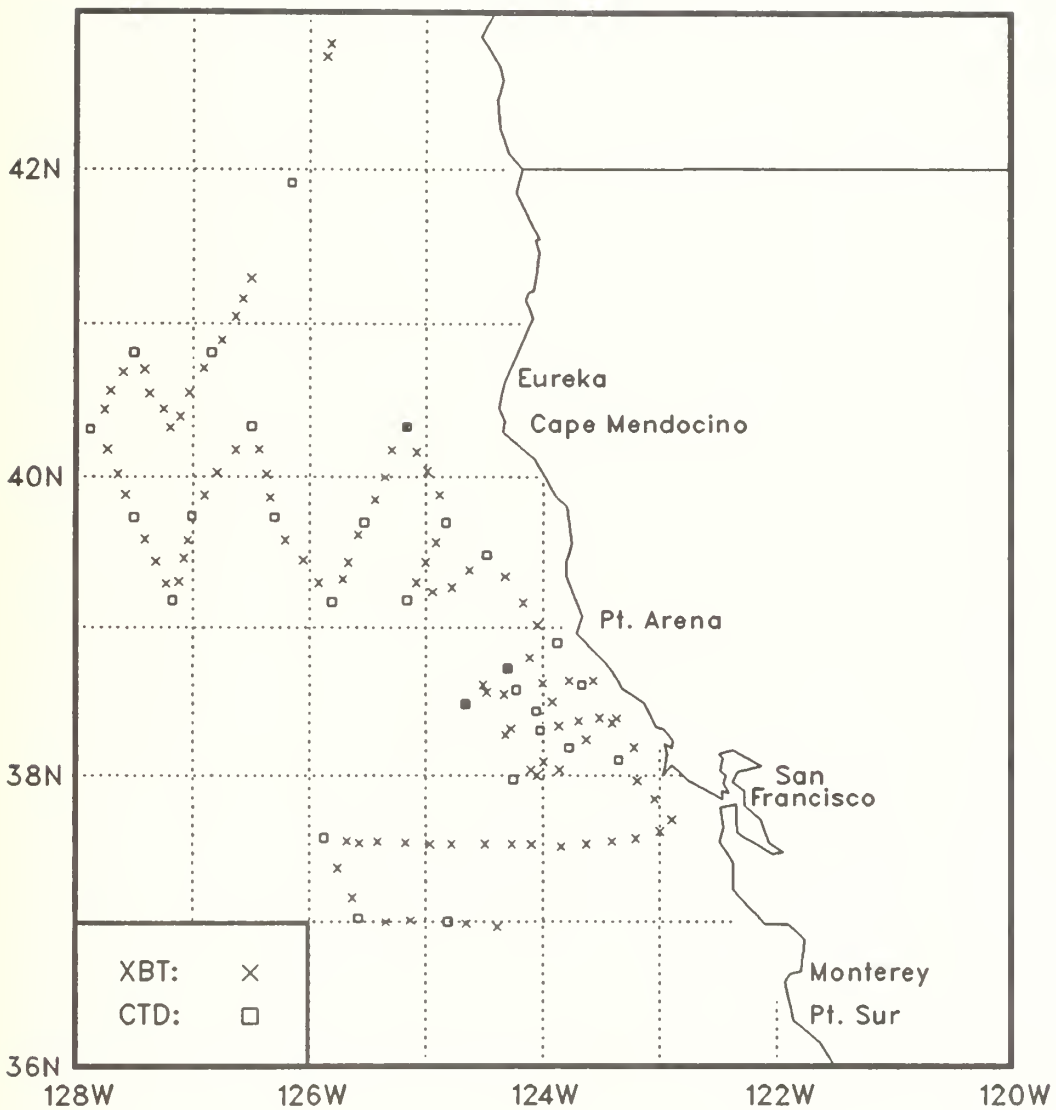


Figure 32: XBT and CTD locations for OPTOMA11, Leg DI.

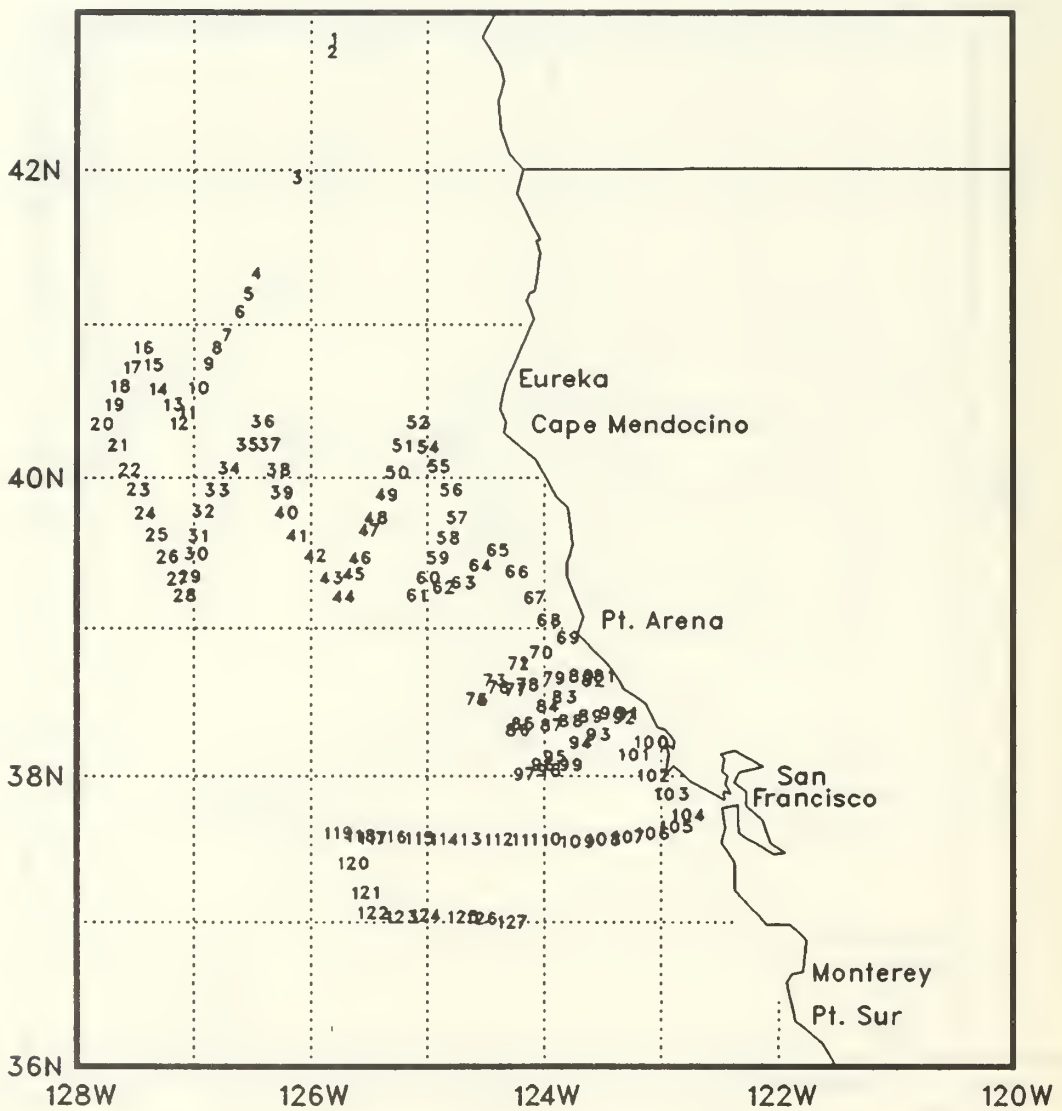


Figure 33: Station numbers for OPTOMA11, Leg DI.

Table 5: Leg DI Station Listing

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
1	XBT	84175	1556	42.48	125.49	14.1			
2	XBT	84175	1625	42.43	125.51	14.1			
3	CTD	84175	2341	41.55	126.09	13.5	31.90	*	*
4	XBT	84176	103	41.18	126.30	12.7			
5	XBT	84176	156	41.10	126.34	13.5			
6	XBT	84176	236	41.03	126.38	13.7			
7	XBT	84176	330	40.54	126.45	14.1			
8	CTD	84176	443	40.49	126.50	14.0	32.68	14.1	32.67
9	XBT	84176	553	40.43	126.54	13.9			
10	XBT	84176	647	40.33	127.02	14.0			
11	XBT	84176	746	40.24	127.06	14.1			
12	XBT	84176	806	40.20	127.12	14.1			
13	XBT	84176	855	40.27	127.15	14.2			
14	XBT	84176	938	40.33	127.22	14.0			
15	XBT	84176	1026	40.42	127.25	14.3			
16	CTD	84176	1130	40.49	127.30	14.2	32.68	14.2	32.68
17	XBT	84176	1247	40.41	127.35	14.2			
18	XBT	84176	1327	40.34	127.42	14.2			
19	XBT	84176	1418	40.27	127.45	14.2			
20	CTD	84176	1510	40.19	127.52	14.4	32.87	14.4	32.89
21	XBT	84176	1642	40.11	127.44	14.5			
22	XBT	84176	1736	40.01	127.38	14.4			
23	XBT	84176	1824	39.53	127.34	14.5			
24	CTD	84176	1938	39.44	127.30	14.1	32.48	14.3	32.47
25	XBT	84176	2050	39.35	127.24	14.1			
26	XBT	84176	2142	39.26	127.19	14.1			
27	XBT	84176	2239	39.18	127.13	14.2			
28	CTD	84177	10	39.11	127.10	14.7	32.79	14.6	32.83
29	XBT	84177	305	39.19	127.07	14.6			
30	XBT	84177	356	39.28	127.04	13.9			
31	XBT	84177	438	39.35	127.02	14.2			
32	CTD	84177	634	39.45	127.00	14.0	32.47	14.0	*
33	XBT	84177	739	39.53	126.54	14.1			
34	XBT	84177	851	40.02	126.47	14.2			
35	XBT	84177	953	40.11	126.38	14.3			
36	CTD	84177	1105	40.20	126.30	14.1	32.66	14.2	32.68
37	XBT	84177	1243	40.11	126.26	14.4			
38	XBT	84177	1335	40.01	126.22	14.0			
39	XBT	84177	1419	39.52	126.20	14.1			
40	CTD	84177	1527	39.44	126.18	13.8	32.36	13.8	32.41
41	XBT	84177	1646	39.35	126.12	14.0			
42	XBT	84177	1739	39.27	126.03	13.8			
43	XBT	84177	1844	39.18	125.55	13.7			
44	CTD	84177	2010	39.10	125.48	13.7	32.45	13.7	32.49
45	XBT	84177	2302	39.20	125.43	14.2			

* Data not available

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
46	XBT	84177	2350	39.26	125.40	14.3			
47	XBT	84178	55	39.37	125.35	12.8			
48	CTD	84178	135	39.42	125.32	12.8	33.02	12.6	33.05
49	XBT	84178	306	39.51	125.26	13.5			
50	XBT	84178	400	40.00	125.21	13.8			
51	XBT	84178	501	40.11	125.18	13.2			
52	CTD	84178	615	40.20	125.10	12.8	32.79	13.0	32.77
53	XBT	84178	631	40.20	125.10	12.9			
54	XBT	84178	743	40.10	125.05	13.0			
55	XBT	84178	834	40.02	124.59	13.5			
56	XBT	84178	936	39.53	124.53	13.4			
57	CTD	84178	1110	39.42	124.50	14.0	32.66	14.0	32.70
58	XBT	84178	1242	39.34	124.55	13.9			
59	XBT	84178	1325	39.26	125.00	14.0			
60	XBT	84178	1418	39.18	125.05	13.9			
61	CTD	84178	1513	39.11	125.10	13.6	32.50	13.8	32.51
62	XBT	84178	1835	39.14	124.57	14.1			
63	XBT	84178	1928	39.16	124.47	14.1			
64	XBT	84178	2050	39.23	124.38	14.4			
65	CTD	84178	2125	39.29	124.29	14.3	32.59	14.5	33.64
66	XBT	84178	2300	39.21	124.20	13.9			
67	XBT	84179	3	39.10	124.10	11.9			
68	XBT	84179	56	39.01	124.03	11.1			
69	CTD	84179	219	38.54	123.53	11.0	33.42	10.8	33.44
70	XBT	84179	335	38.48	124.07	11.7			
71	CTD	84179	439	38.44	124.18	11.2	33.31	11.5	33.35
72	XBT	84179	511	38.44	124.18	11.2			
73	XBT	84179	607	38.37	124.31	13.1			
74	CTD	84179	705	38.29	124.40	14.1	32.64	14.3	33.70
75	XBT	84179	746	38.29	124.40	14.2			
76	XBT	84179	906	38.34	124.29	12.4			
77	XBT	84179	1019	38.33	124.20	11.6			
78	CTD	84179	1110	38.35	124.14	12.1	33.50	12.2	33.51
79	XBT	84179	1252	38.38	124.00	11.6			
80	XBT	84179	1346	38.39	123.47	10.7			
81	XBT	84179	1438	38.39	123.34	9.7			
82	CTD	84179	1539	38.37	123.40	10.6	33.44	10.9	33.44
83	XBT	84179	1725	38.30	123.56	11.4			
84	CTD	84179	1810	38.26	124.04	11.9	33.47	11.7	*
85	XBT	84179	2011	38.19	124.17	12.0			
86	XBT	84179	2244	38.17	124.19	12.0			
87	CTD	84180	22	38.19	124.02	11.3	33.33	12.1	33.30
88	XBT	84180	128	38.20	123.52	11.8			
89	XBT	84180	215	38.22	123.42	11.7			
90	XBT	84180	300	38.24	123.31	10.1			

* Data not available

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
91	XBT	84180	350	38.23	123.23	9.6			
92	XBT	84180	414	38.22	123.25	10.0			
93	XBT	84180	546	38.15	123.38	11.5			
94	CTD	84180	735	38.11	123.47	11.2	33.37	11.5	33.39
95	XBT	84180	905	38.06	124.00	10.8			
96	XBT	84180	1005	38.03	124.06	11.3			
97	CTD	84180	1125	37.59	124.15	11.5	33.54	11.5	33.55
98	XBT	84180	1314	38.00	124.03	11.2			
99	XBT	84180	1415	38.02	123.52	10.4			
100	XBT	84180	1805	38.12	123.13	9.9			
101	CTD	84180	1939	38.07	123.21	9.6	33.64	9.9	*
102	XBT	84180	2116	37.58	123.12	10.3			
103	XBT	84180	2214	37.51	123.03	11.0			
104	XBT	84180	2314	37.42	122.54	11.9			
105	XBT	84181	15	37.37	123.00	11.5			
106	XBT	84181	114	37.34	123.12	12.5			
107	XBT	84181	214	37.33	123.24	12.6			
108	XBT	84181	314	37.32	123.38	13.3			
109	XBT	84181	414	37.31	123.51	13.3			
110	XBT	84181	515	37.32	124.06	13.2			
111	XBT	84181	613	37.32	124.16	13.3			
112	XBT	84181	718	37.32	124.30	13.8			
113	XBT	84181	821	37.32	124.47	13.6			
114	XBT	84181	914	37.32	124.58	13.7			
115	XBT	84181	1007	37.32	125.11	13.8			
116	XBT	84181	1114	37.33	125.25	13.6			
117	XBT	84181	1214	37.32	125.34	13.9			
118	XBT	84181	1315	37.33	125.41	12.6			
119	CTD	84180	1600	37.35	125.52	12.6	33.30	12.6	32.30
120	XBT	84181	1814	37.22	125.45	12.5			
121	XBT	84181	1927	37.10	125.38	14.0			
122	CTD	84181	2036	37.02	125.35	15.1	32.76	15.3	32.80
123	XBT	84181	2314	37.00	125.21	14.9			
124	XBT	84182	14	37.01	125.08	14.2			
125	CTD	84182	225	37.00	124.49	13.8	32.76	13.9	32.82
126	XBT	84182	400	36.59	124.40	13.3			
127	XBT	84182	500	36.58	124.23	13.1			

* Data not available

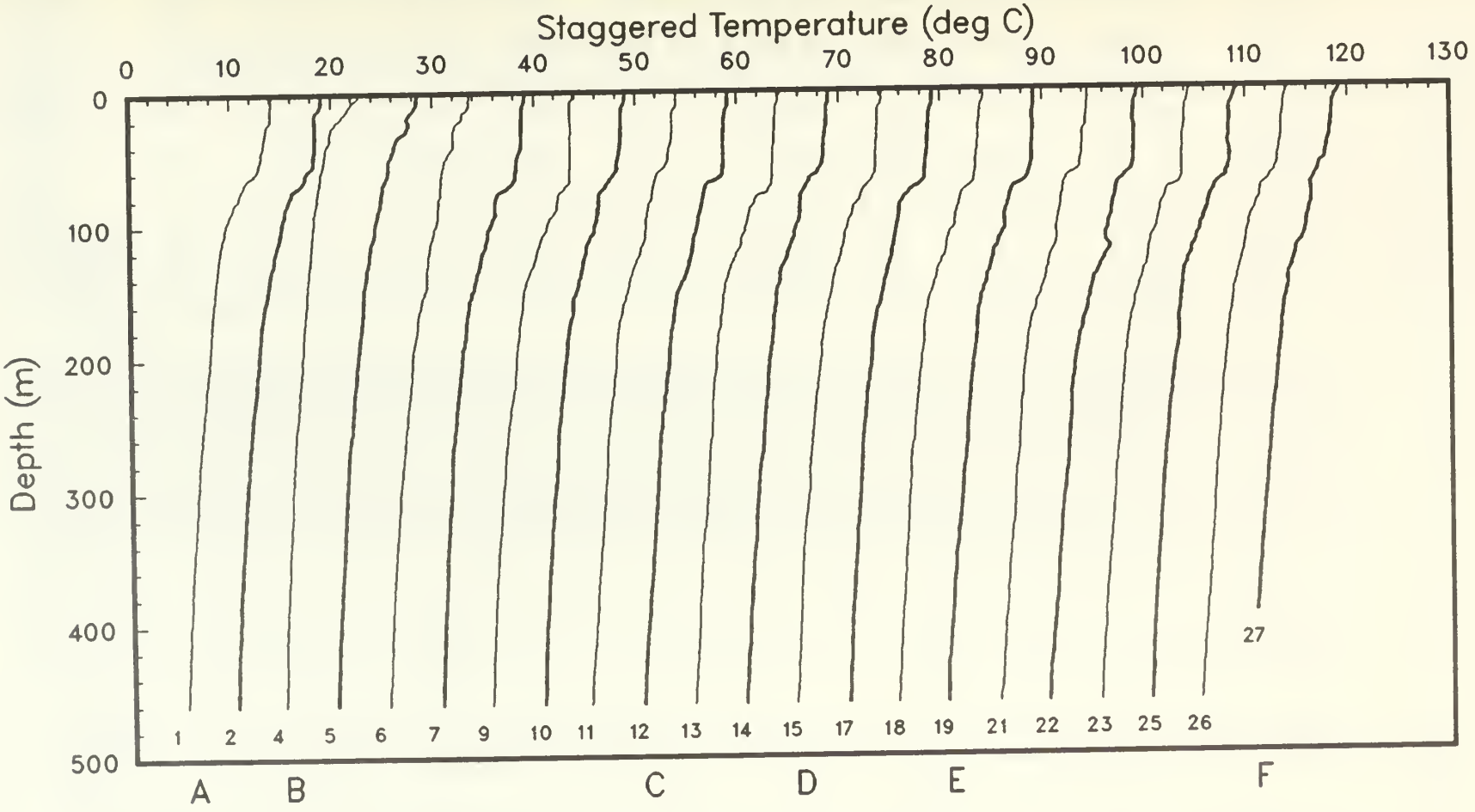


Figure 34(a): XBT temperature profiles, staggered by multiples of 5C (OPTOMA11, Leg DI).

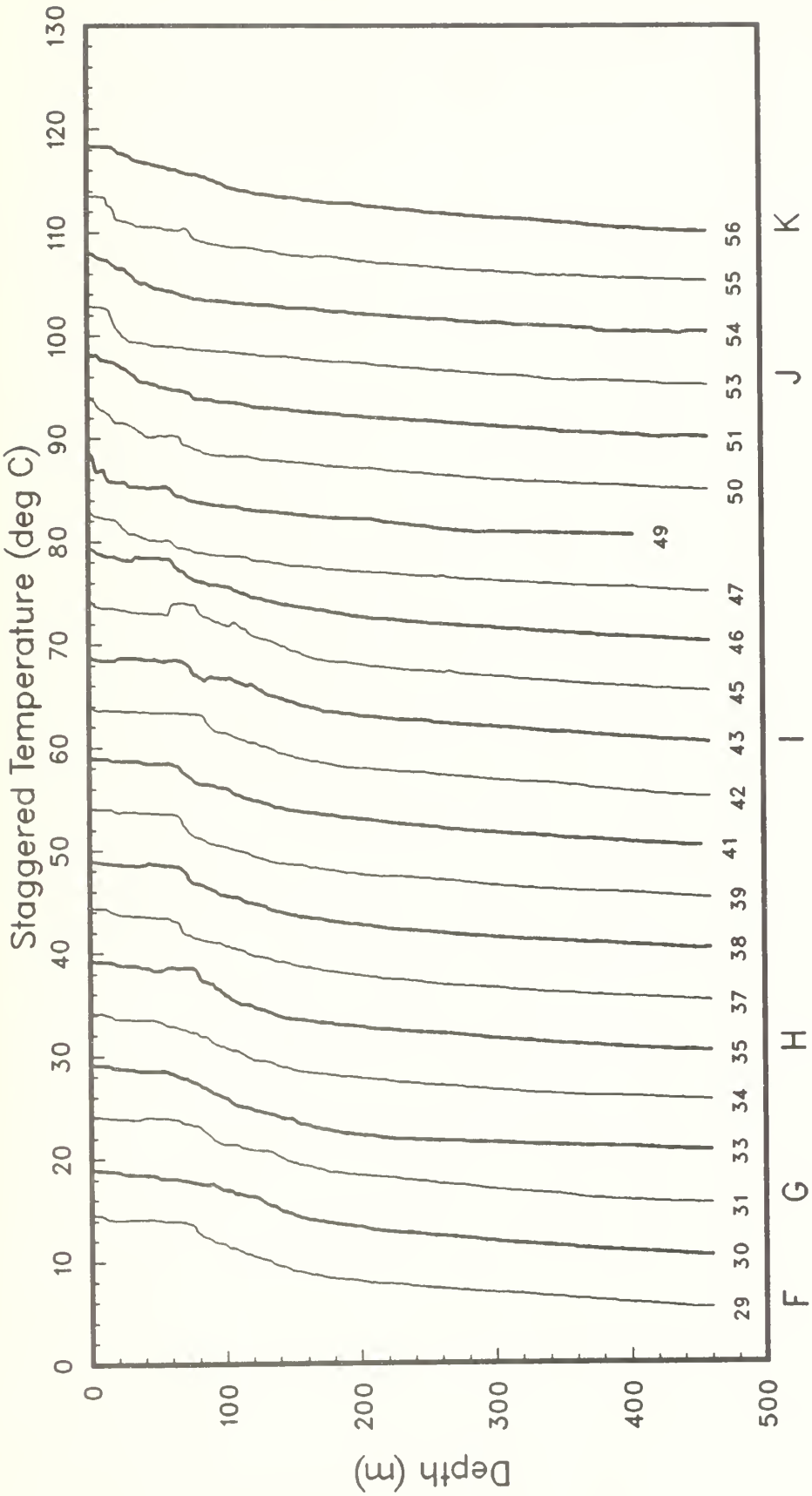

Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
Depth (m)
0
100
200
300
400
500
29
30
31
33
34
35
37
38
39
41
42
43
45
46
47
49
50
51
53
54
55
56
F
G
H
I
J
K

Figure 34(b).

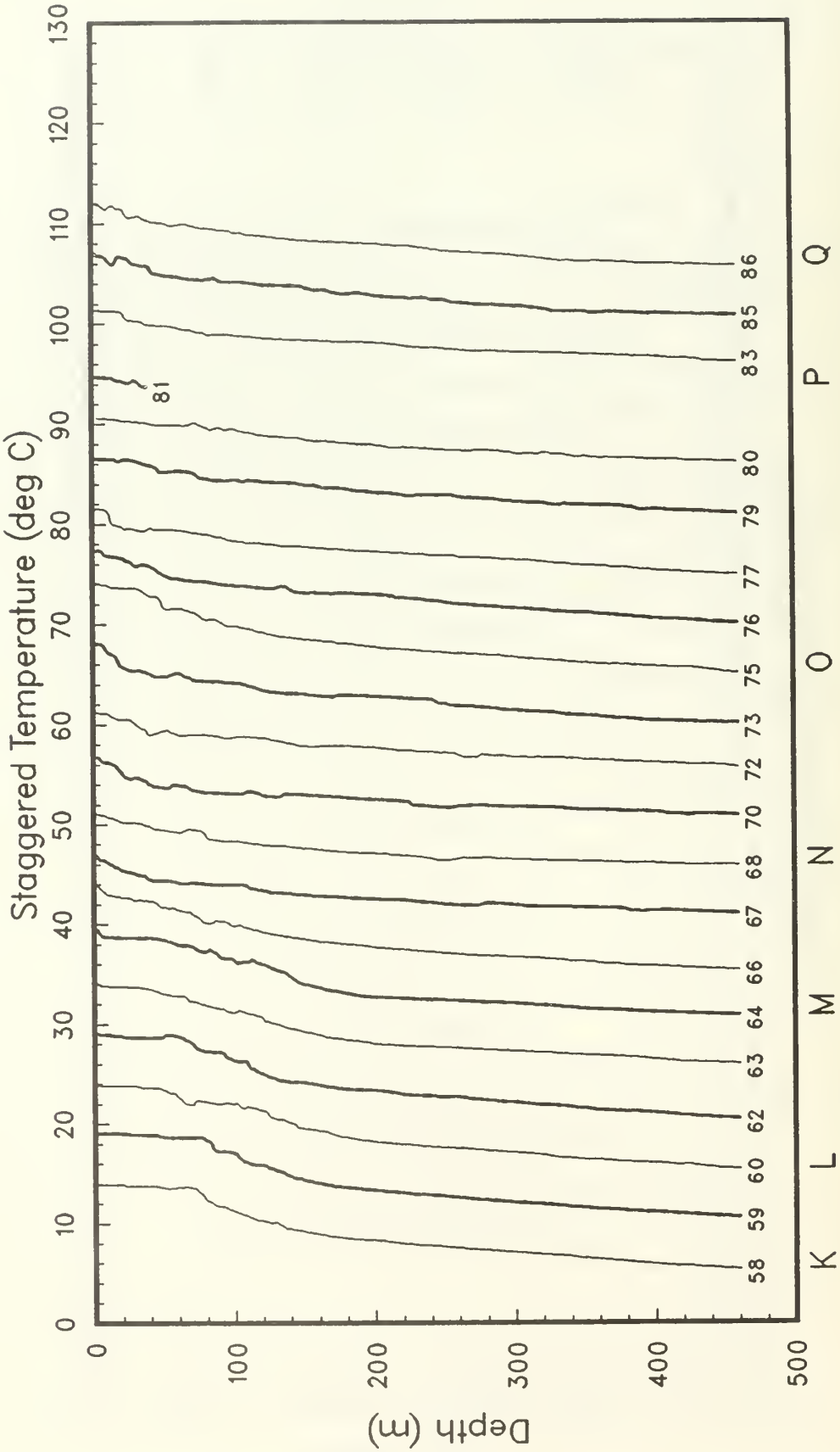

Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
Depth (m)
0
100
200
300
400
500
58
59
60
62
63
64
66
67
68
70
72
73
75
76
77
79
80
81
83
85
86
K
L
M
N
O
P
Q

Figure 34(c).

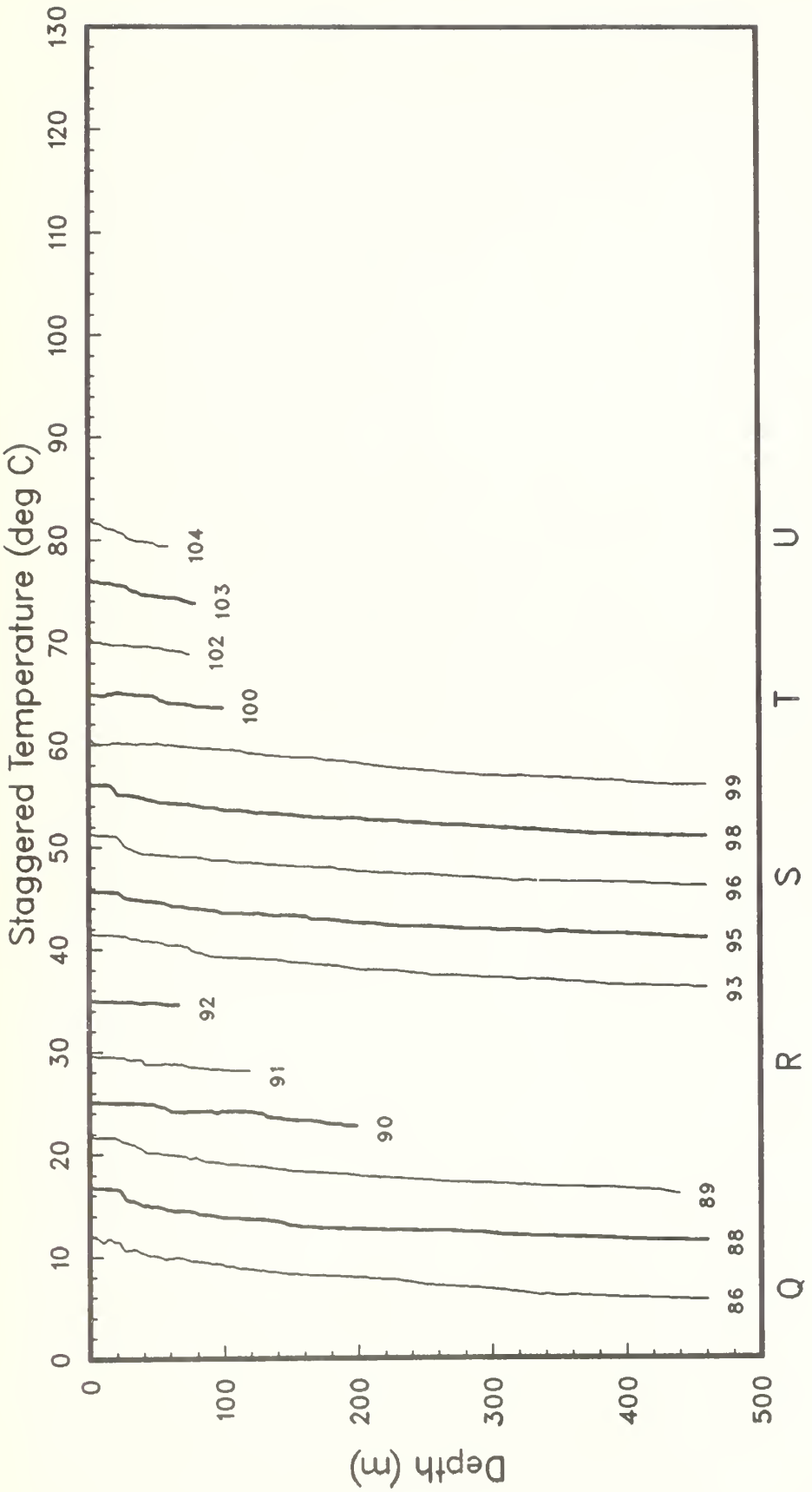

Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
Depth (m)
0
100
200
300
400
500
Q
R
S
T
U
86
88
89
90
91
92
93
95
96
98
99
100
102
103
104

Figure 34(d).

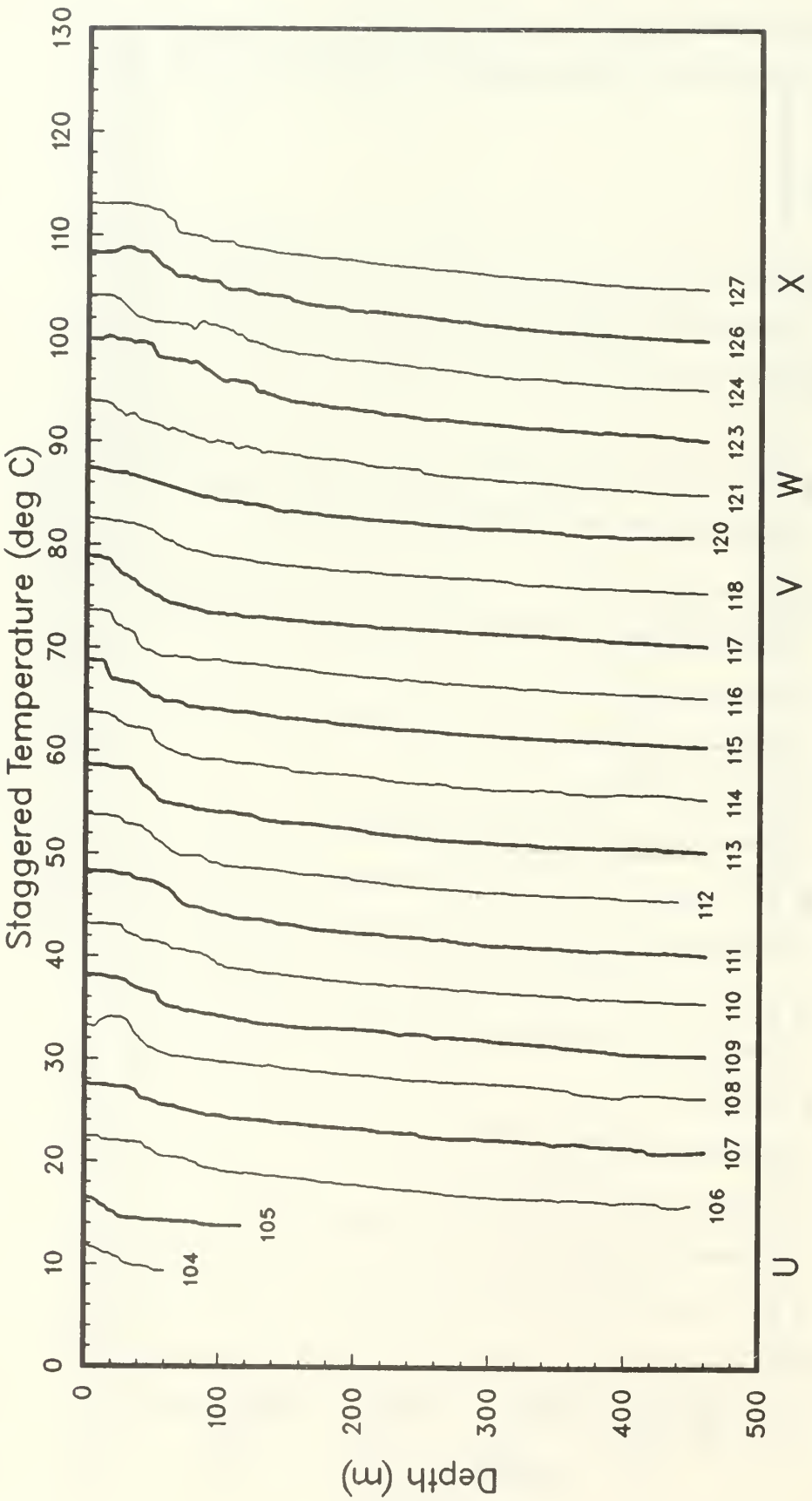

Staggered Temperature (deg C)
Depth (m)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
0
100
200
300
400
500
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
120
121
123
124
126
127
U
V
W
X

Figure 34(e).

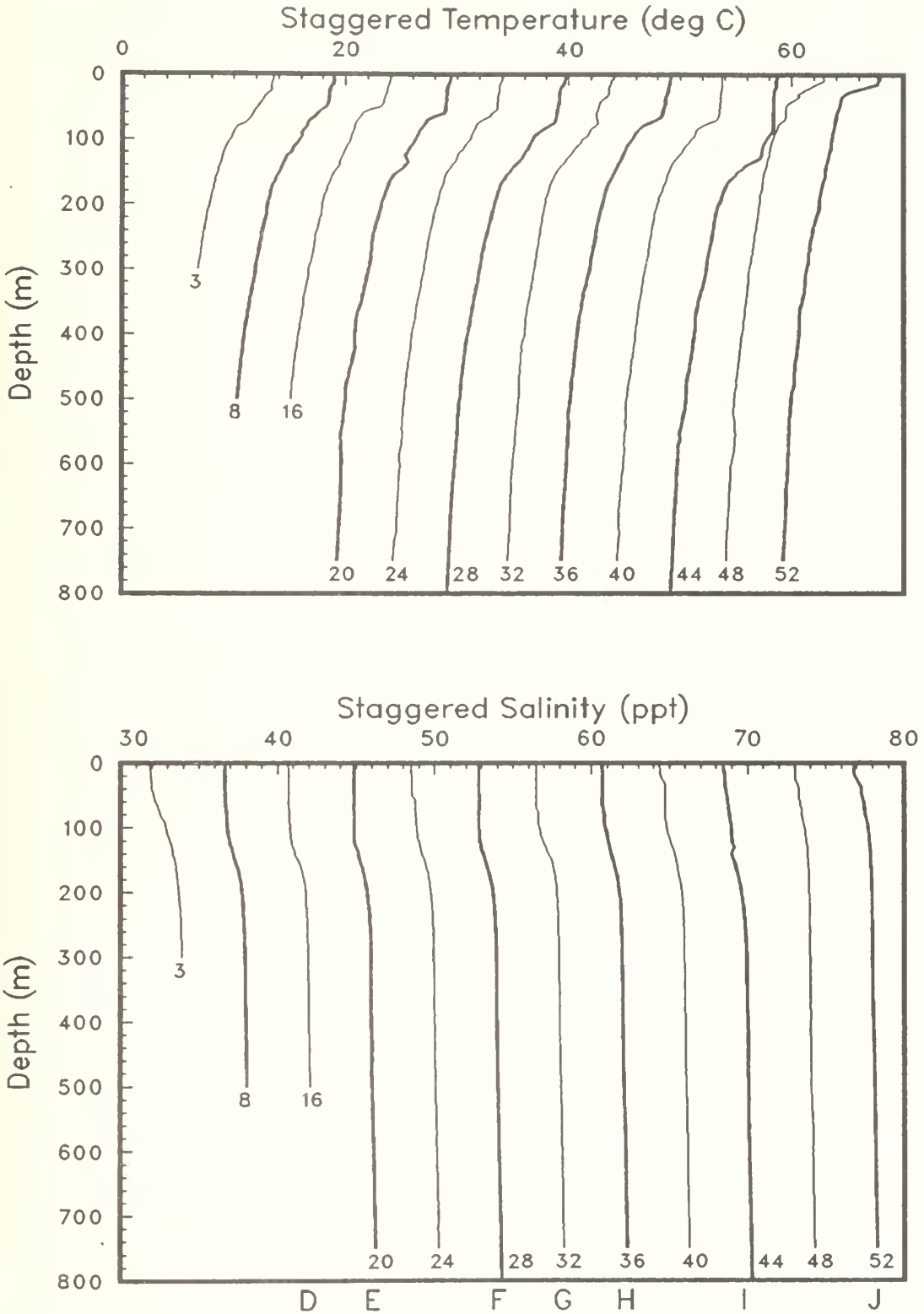


Figure 35(a): CTD temperature profiles, staggered by multiples of 5C, and salinity profiles, staggered by multiples of 4 ppt. (OPTOMA11, Leg DI).

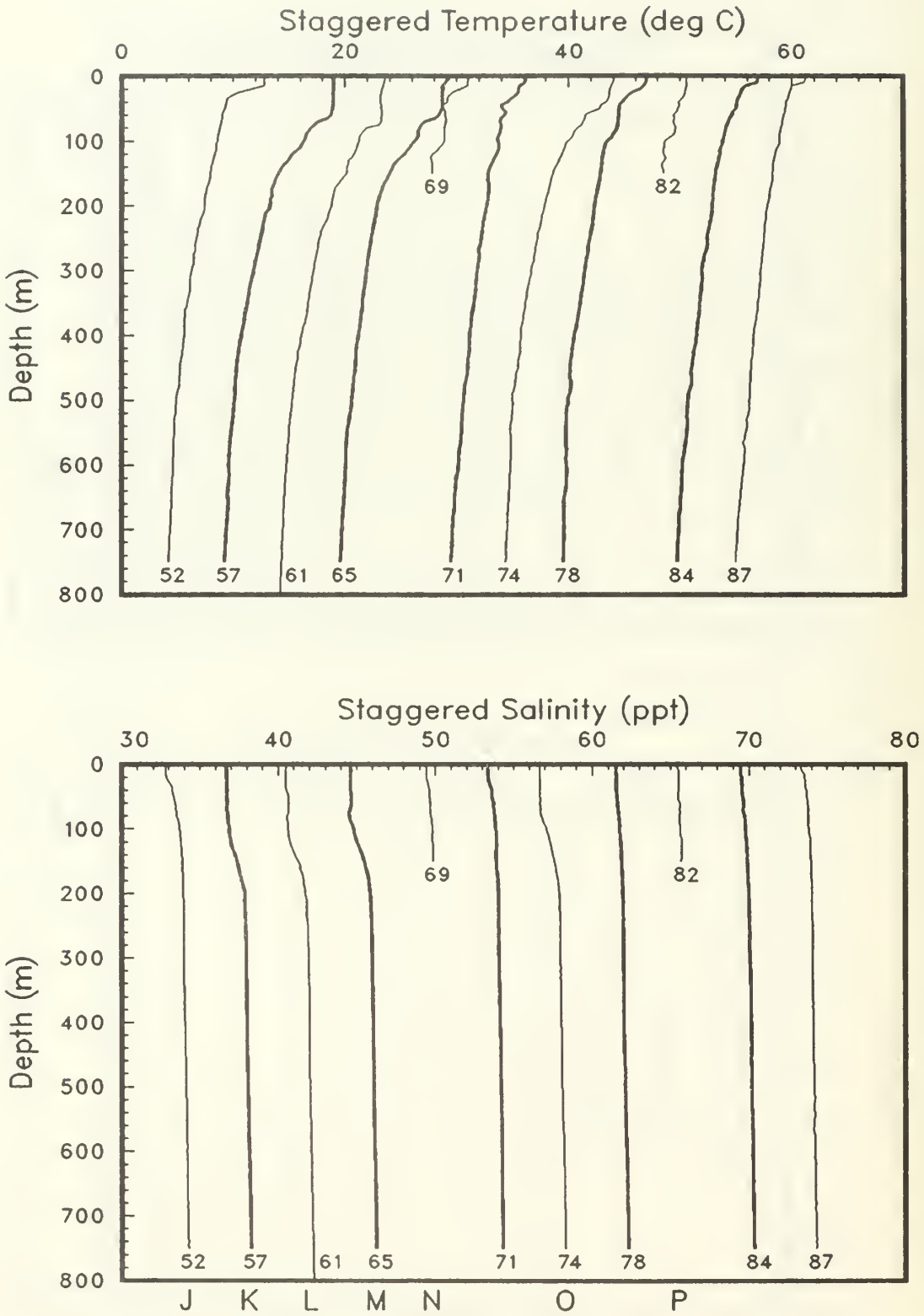

Staggered Temperature (deg C)
0
20
40
60
Depth (m)
0
100
200
300
400
500
600
700
800
69
82
52
57
61
65
71
74
78
84
87
Staggered Salinity (ppt)
30
40
50
60
70
80
J
K
L
M
N
O
P

Figure 35(b).

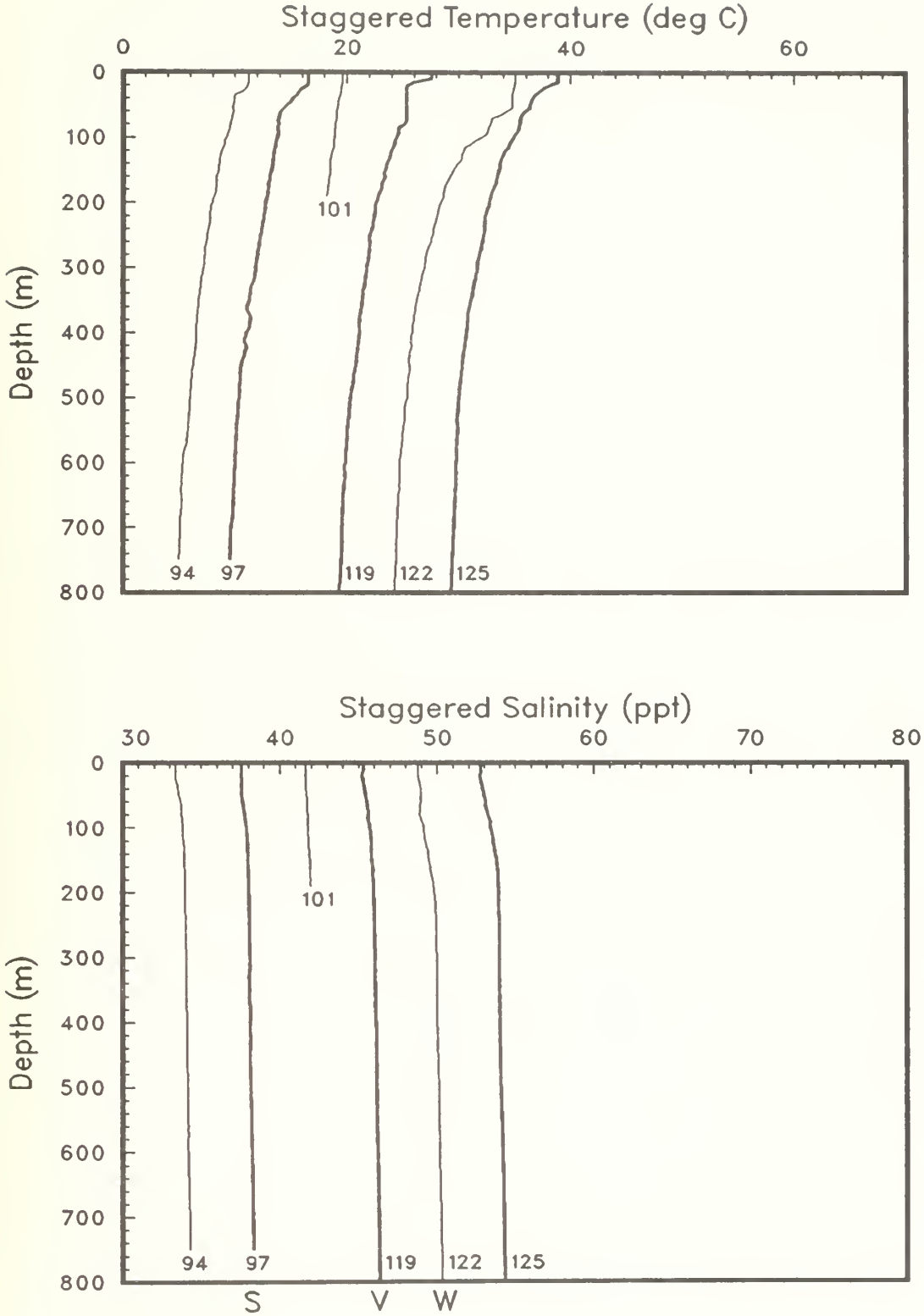

Staggered Temperature (deg C)
0
20
40
60
Depth (m)
0
100
200
300
400
500
600
700
800
94
97
101
119
122
125
Staggered Salinity (ppt)
30
40
50
60
70
80
Depth (m)
0
100
200
300
400
500
600
700
800
94
97
101
119
122
125
S
V
W

Figure 35(c).

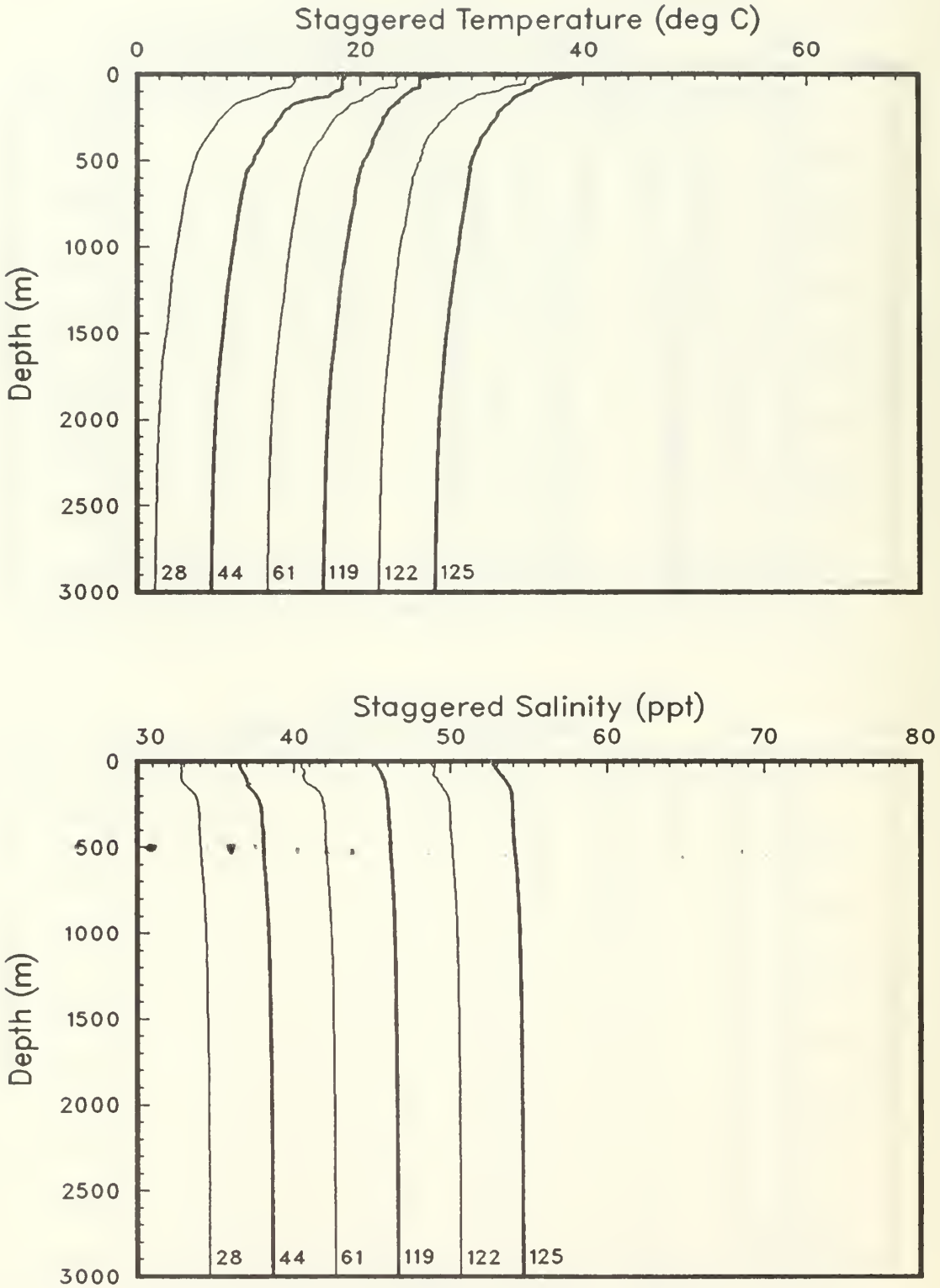


Figure 36: CTD casts to 3000m. Temperature profiles are staggered by multiples of 5C and salinity profiles by 4 ppt. (OPTOMA11, Leg DI).

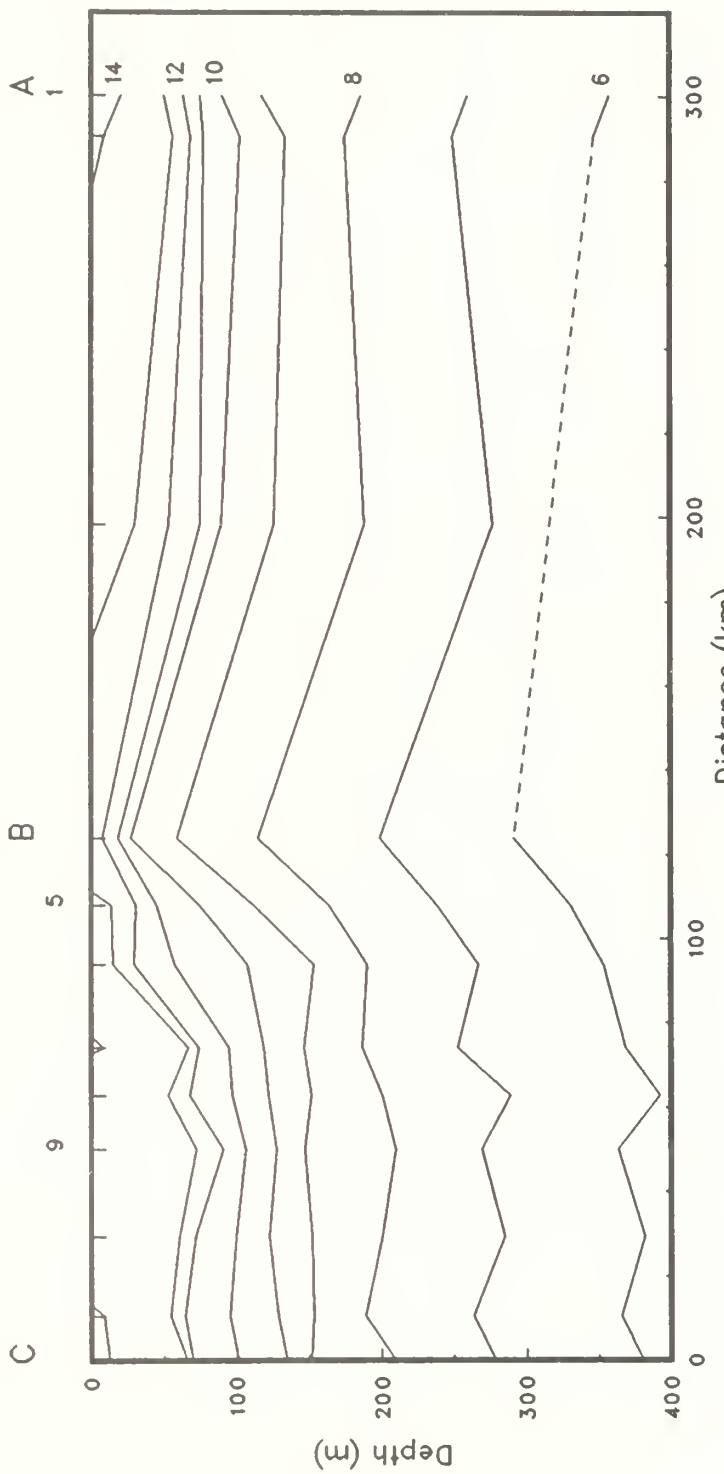


Figure 37(a): Along-track isotherms. Tick marks along the upper horizontal axis show station positions. Some station numbers are given. Dashed lines are used if the cast was too shallow. (OPTOMA11, Leg DI).

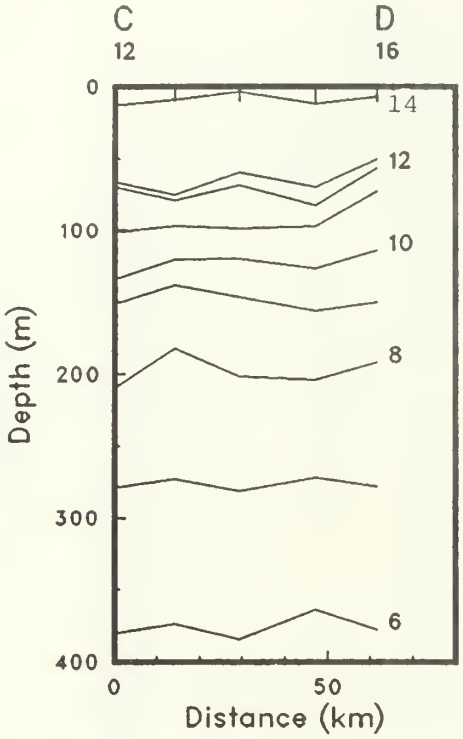


Figure 37(b).

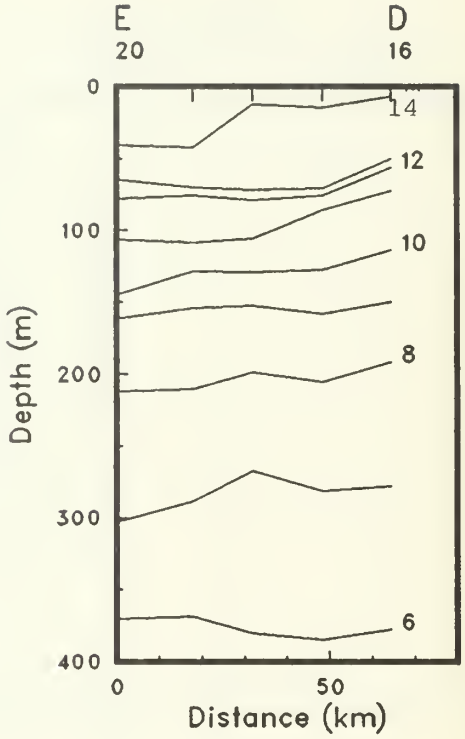


Figure 37(c).

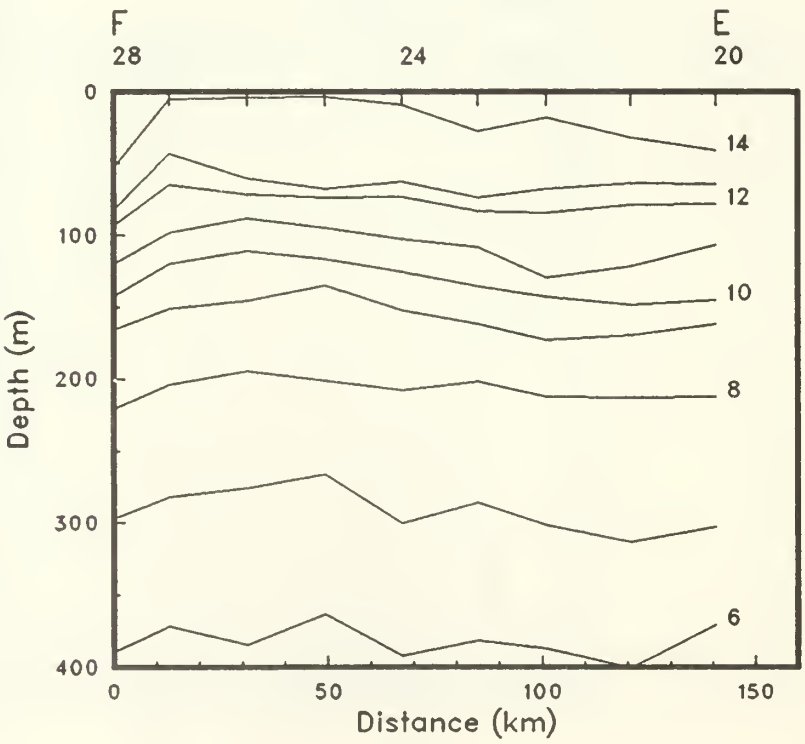


Figure 37(d).

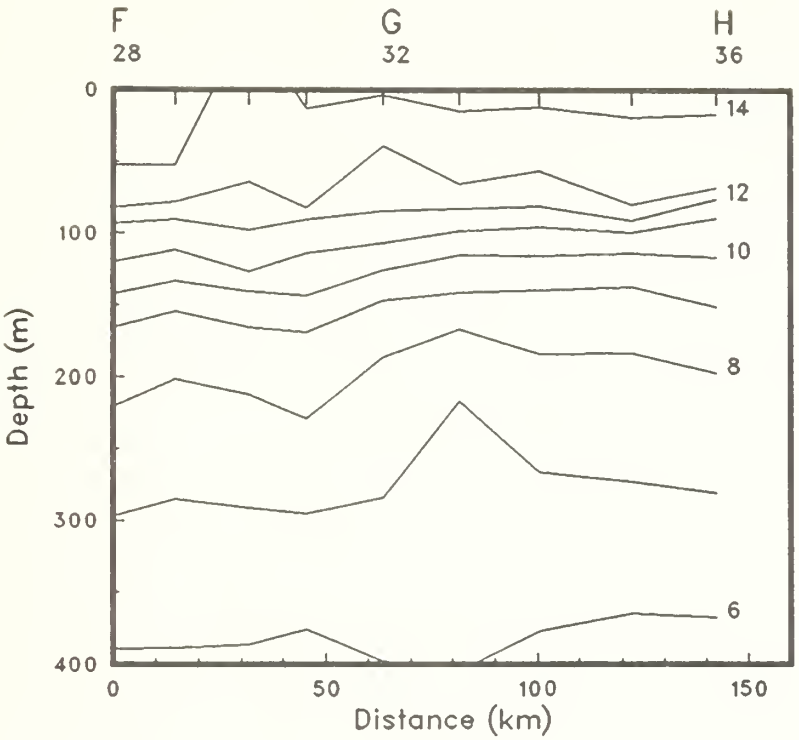


Figure 37(e).

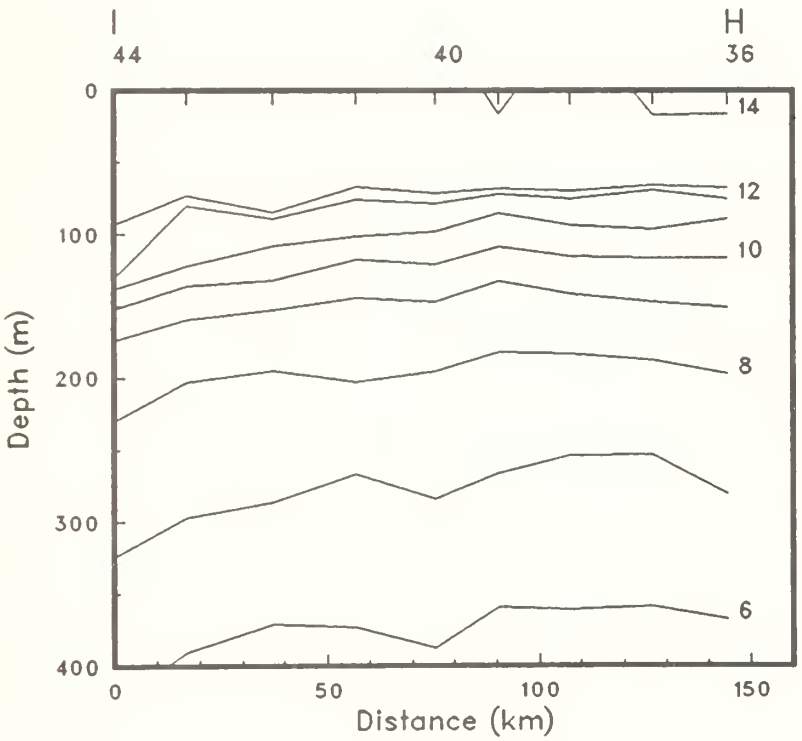


Figure 37(f).

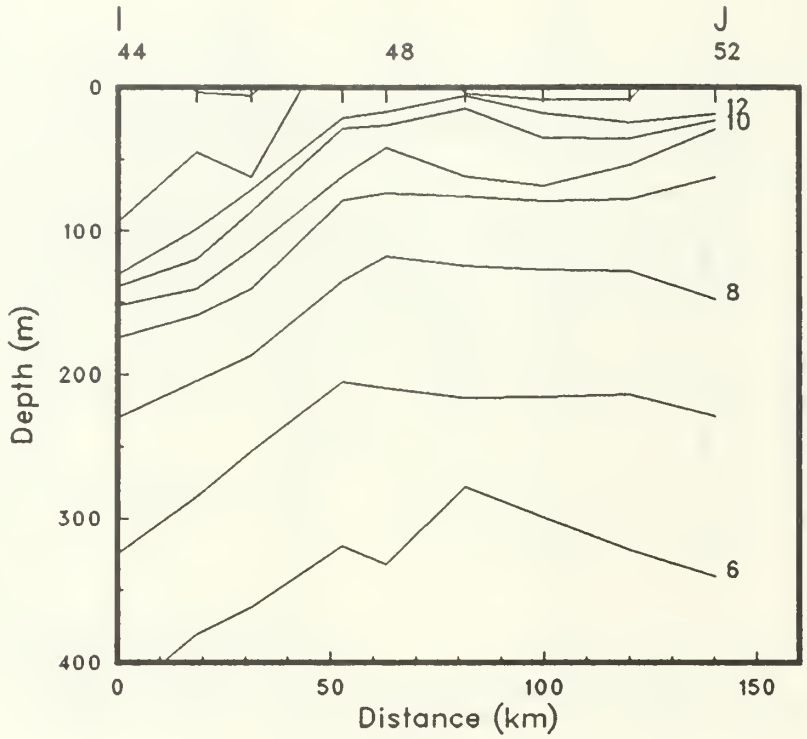


Figure 37(g).

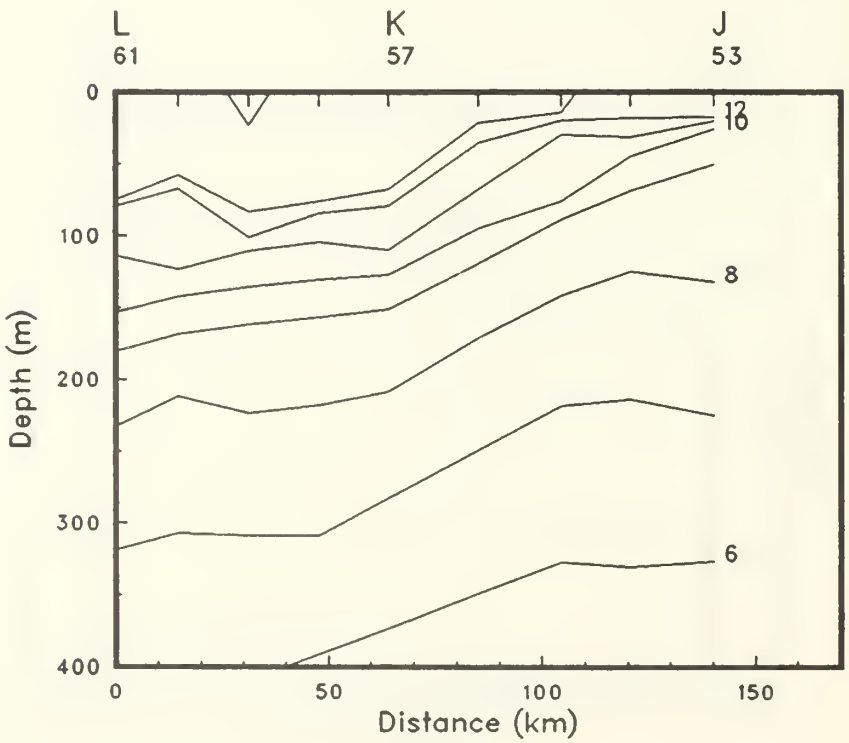


Figure 37(h).

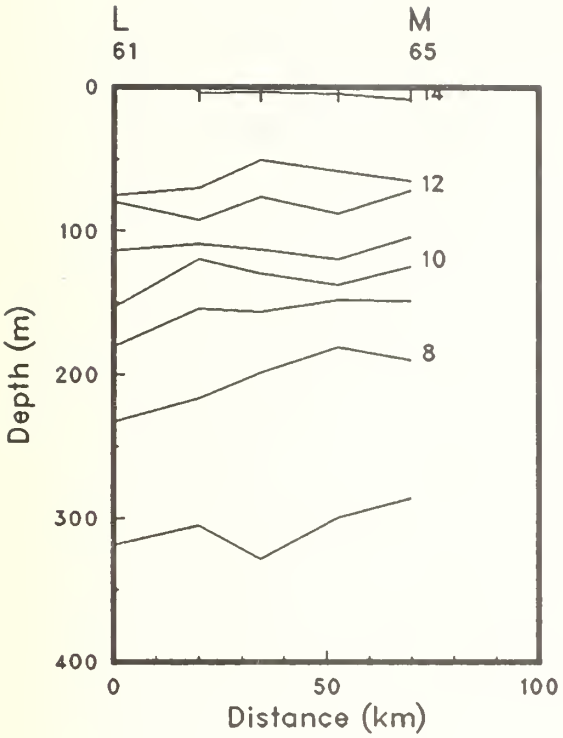


Figure 37(i).

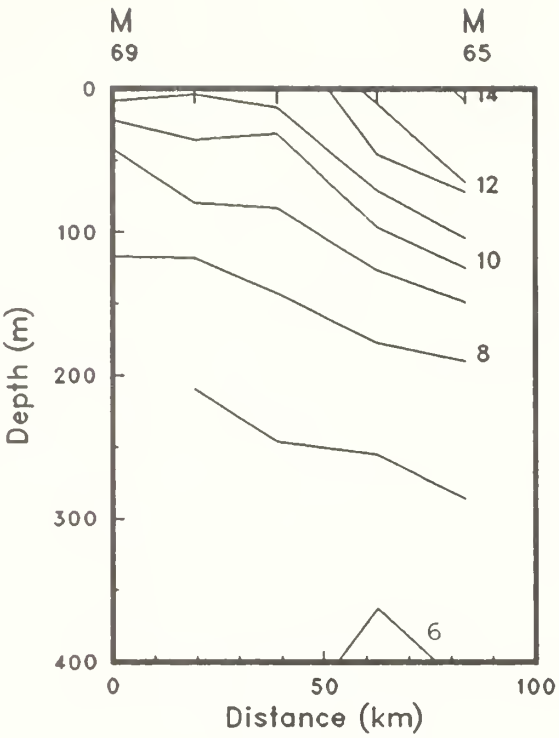


Figure 37(j).

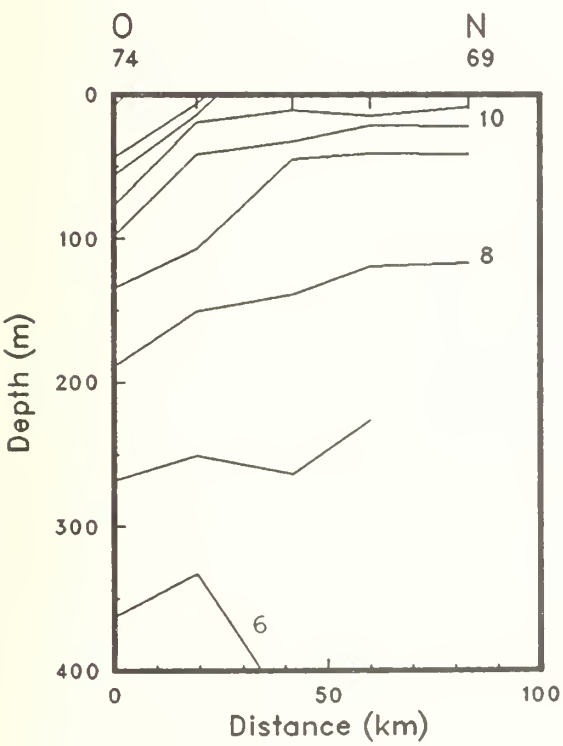


Figure 37(k).

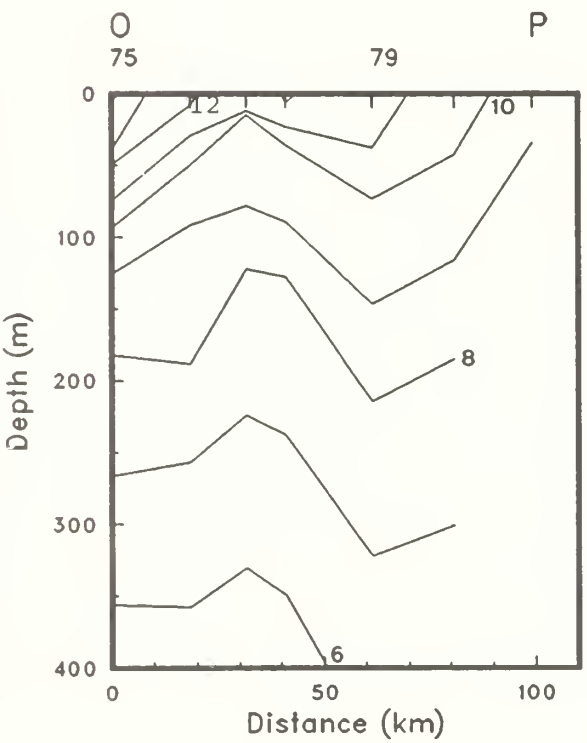


Figure 37(l).

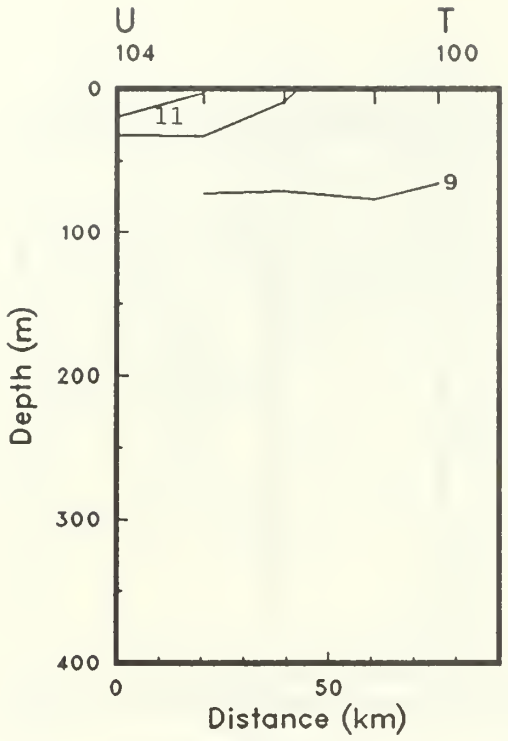


Figure 37(m).

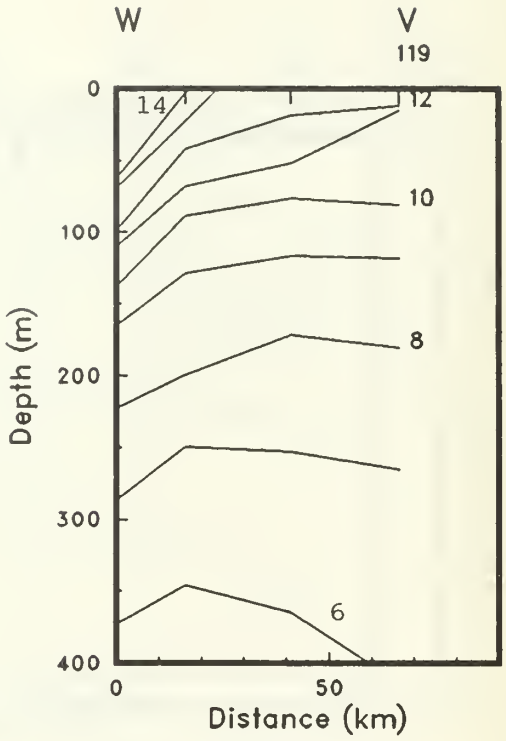


Figure 37(n).

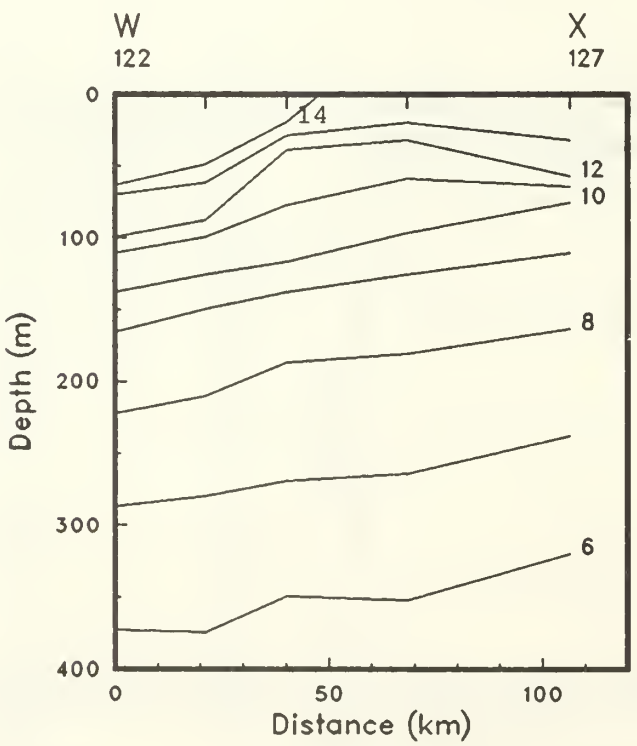


Figure 37(o).

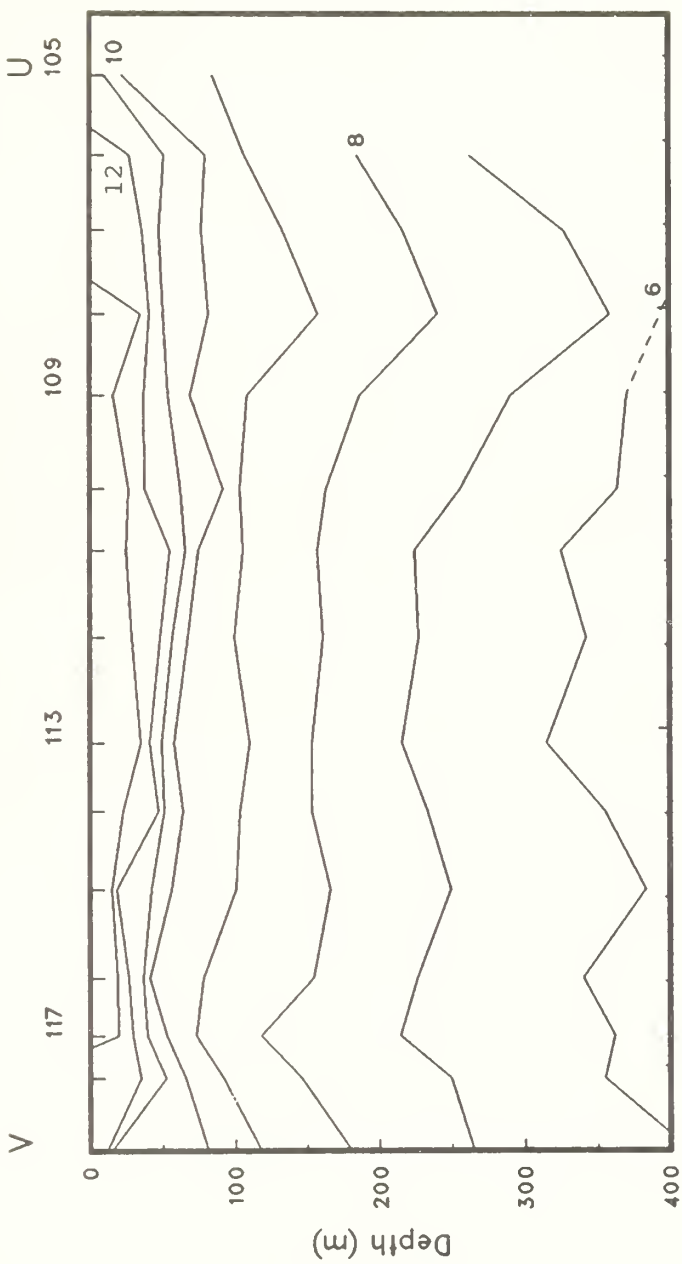

V
117
113
109
U
105
10
12
8
6
0
100
200
300
400
Depth (m)
0
100
200
Distance (km)

Figure 37(p).

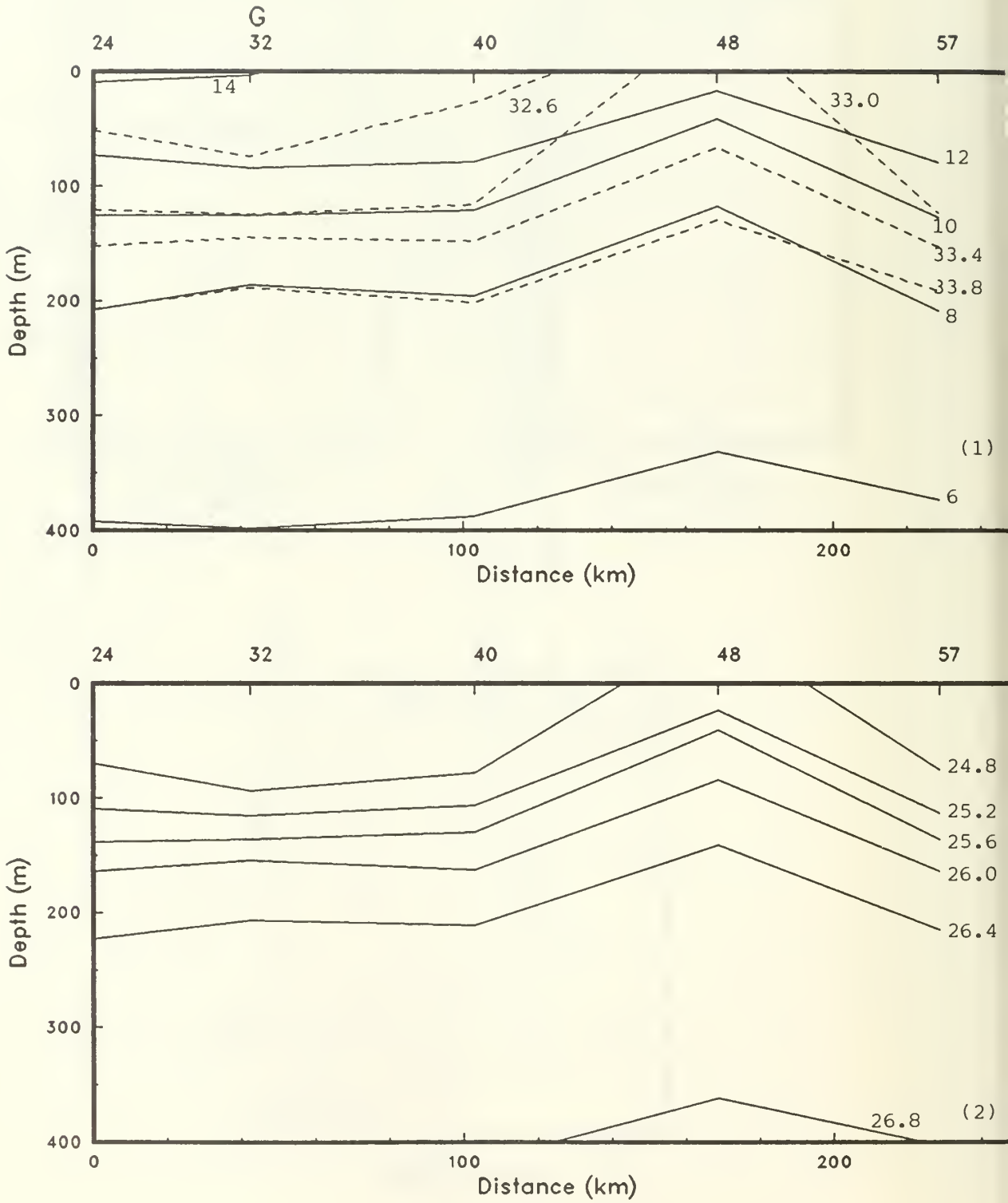


Figure 38(a): Isopleths of (1) temperature and salinity and (2) sigma-t from the CTD's. Dotted lines are used if the cast was too shallow. (OPTOMA11, Leg DI).

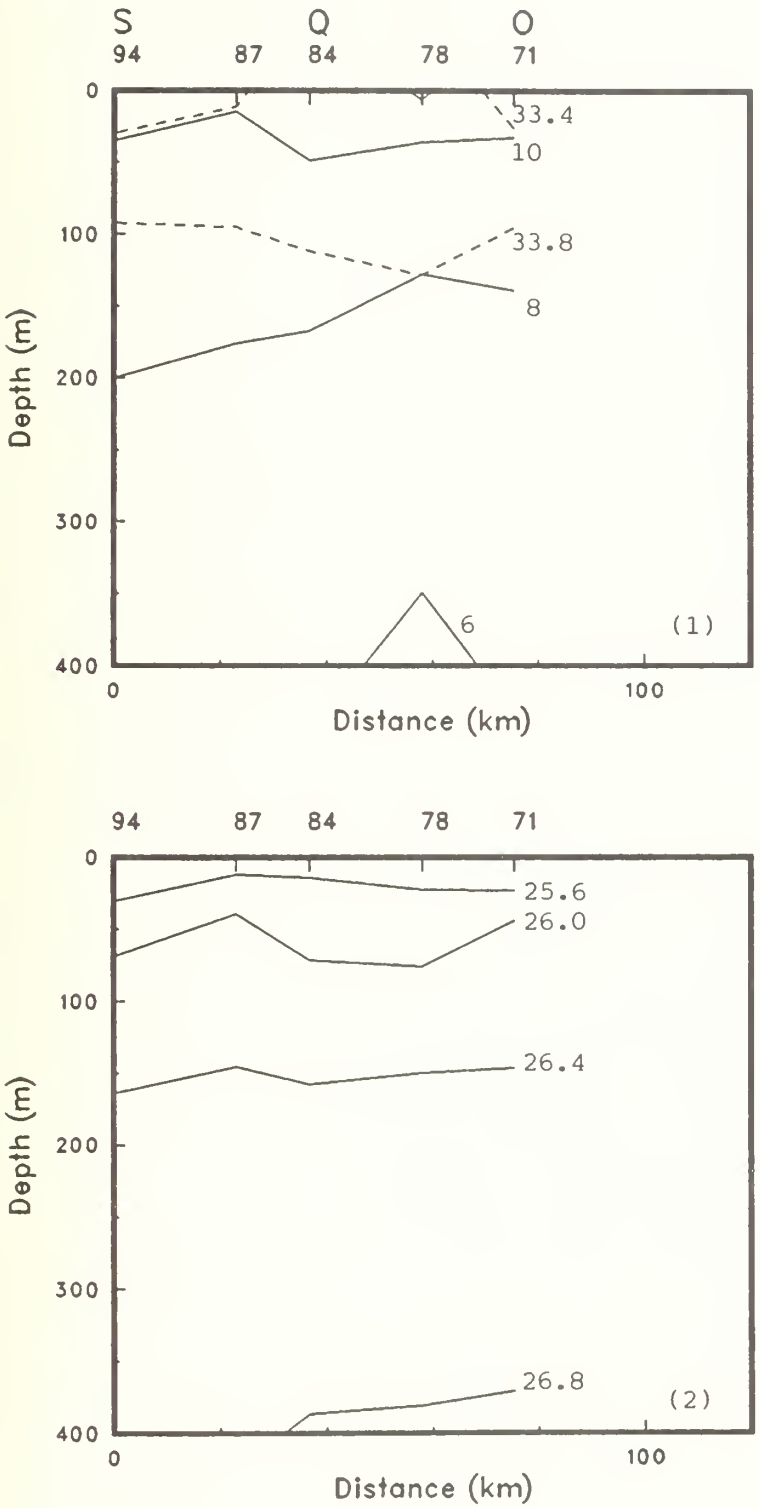
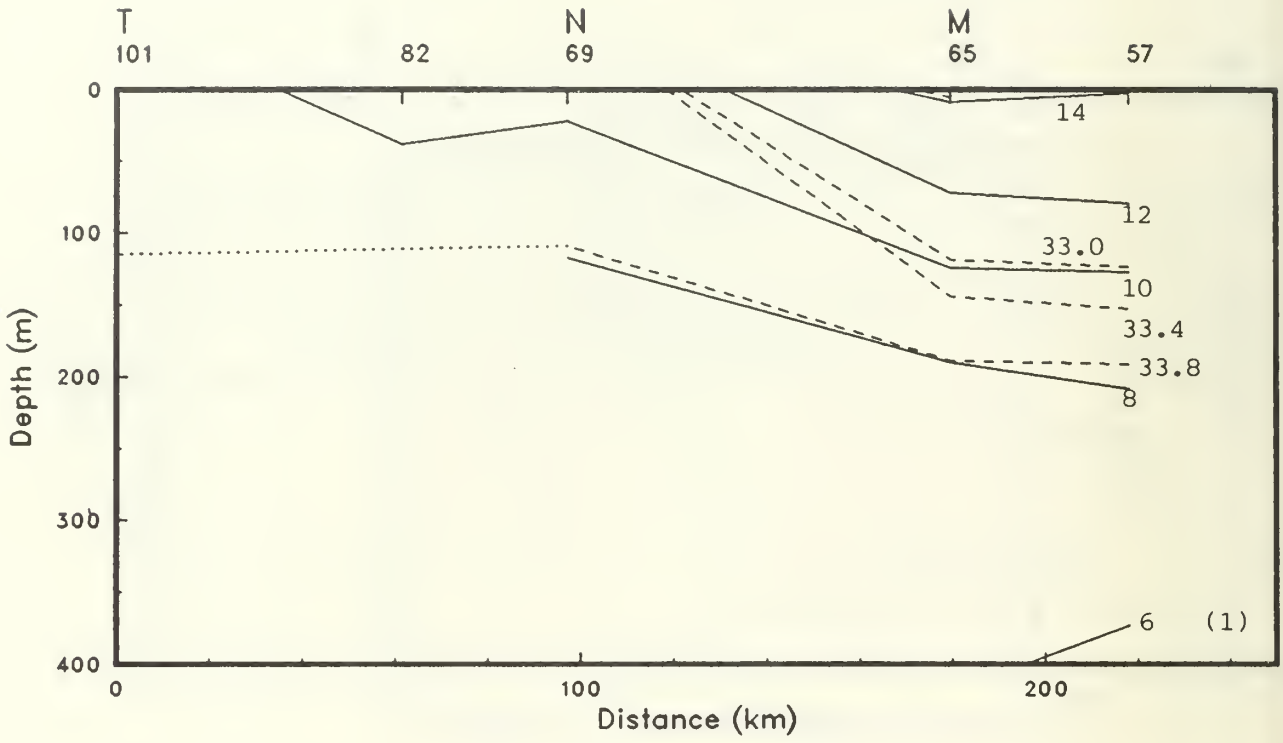

S
Q
O
94
87
84
78
71
0
100
200
300
400
Depth (m)
33.4
10
33.8
8
6
(1)
0
100
Distance (km)
94
87
84
78
71
0
100
200
300
400
Depth (m)
25.6
26.0
26.4
26.8
(2)
0
100
Distance (km)

Figure 38(b).


T
N
M
101
82
69
65
57
0
100
200
300
400
Depth (m)
14
12
33.0
10
33.4
33.8
8
6
(1)
0
100
200
Distance (km)

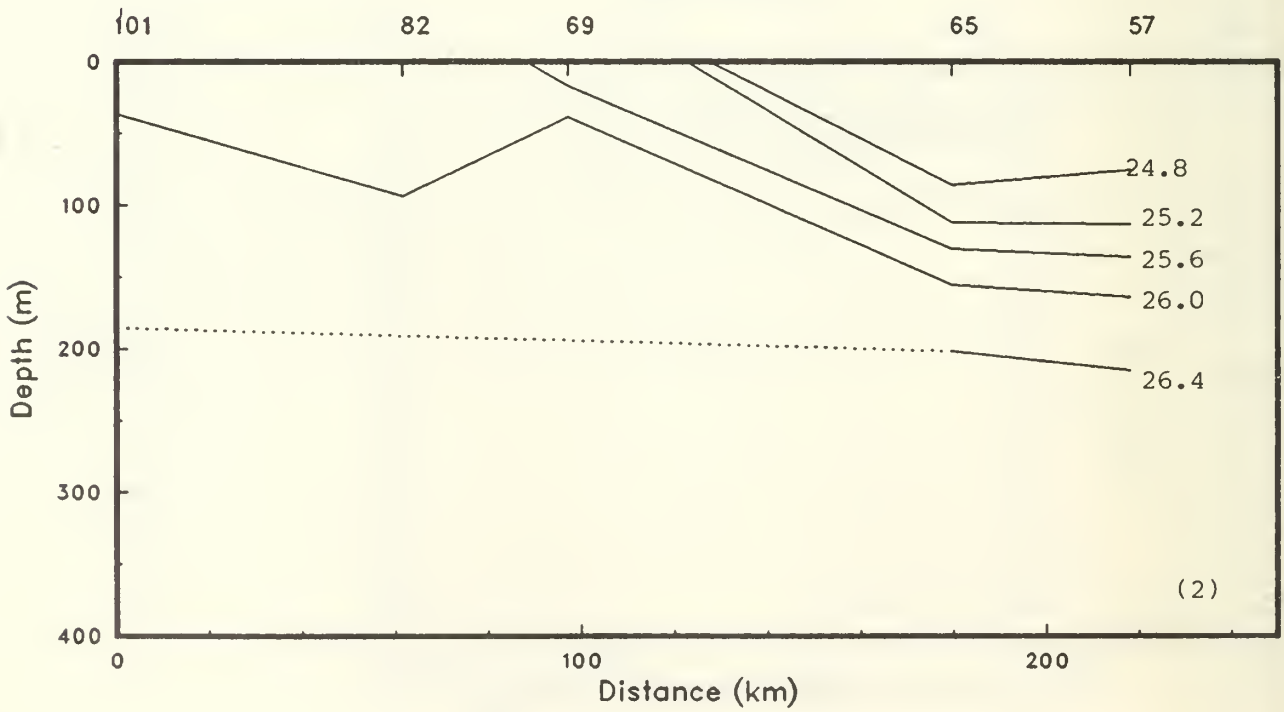

101
82
69
65
57
0
100
200
300
400
Depth (m)
24.8
25.2
25.6
26.0
26.4
(2)
0
100
200
Distance (km)

Figure 38(c).

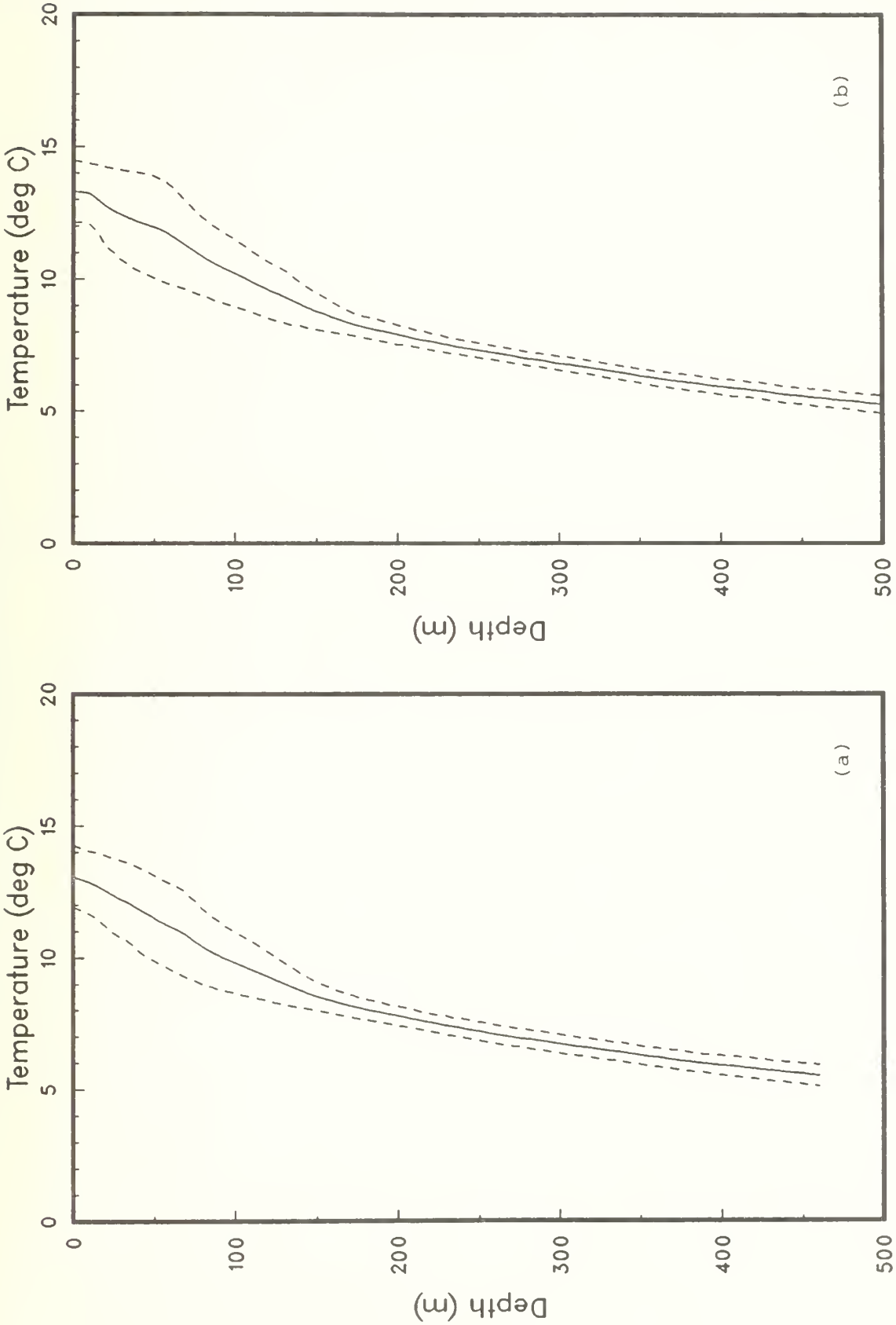


Figure 39: Mean temperature profiles from (a) XBT's and (b) CTD's, with + and - the standard deviation. (OPTOMA11, Leg DI).

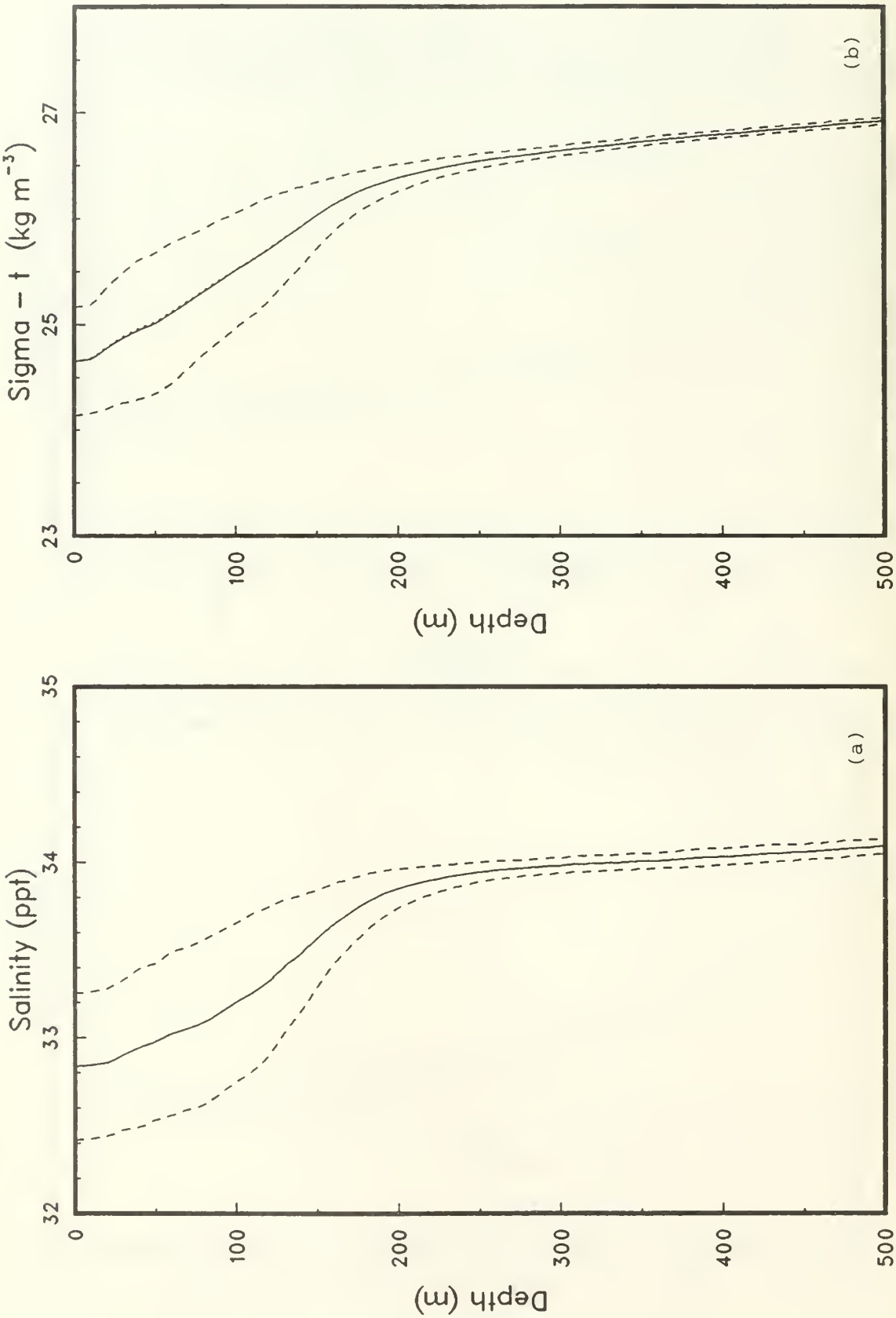


Figure 40: Mean profiles of (a) salinity and (b) sigma-t, with + and - the standard deviations, from the CTD's. (OPTOMA11, Leg DI).

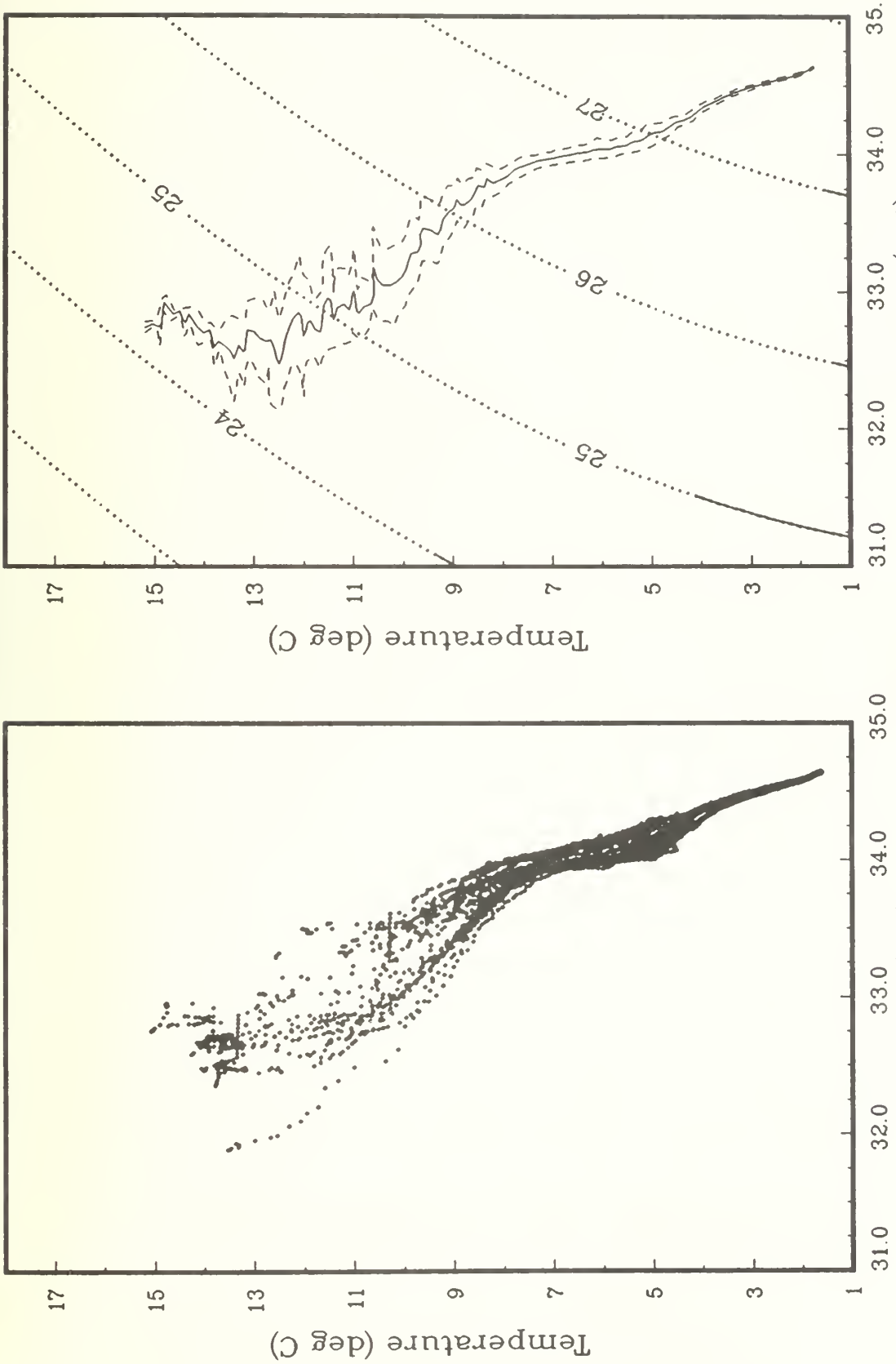


Figure 41: (a) T-S pairs and (b) mean T-S relation, with + and - the standard deviation, from the CTD's. Selected sigma-t contours are also shown. (OPTOMA11, Leg DI).

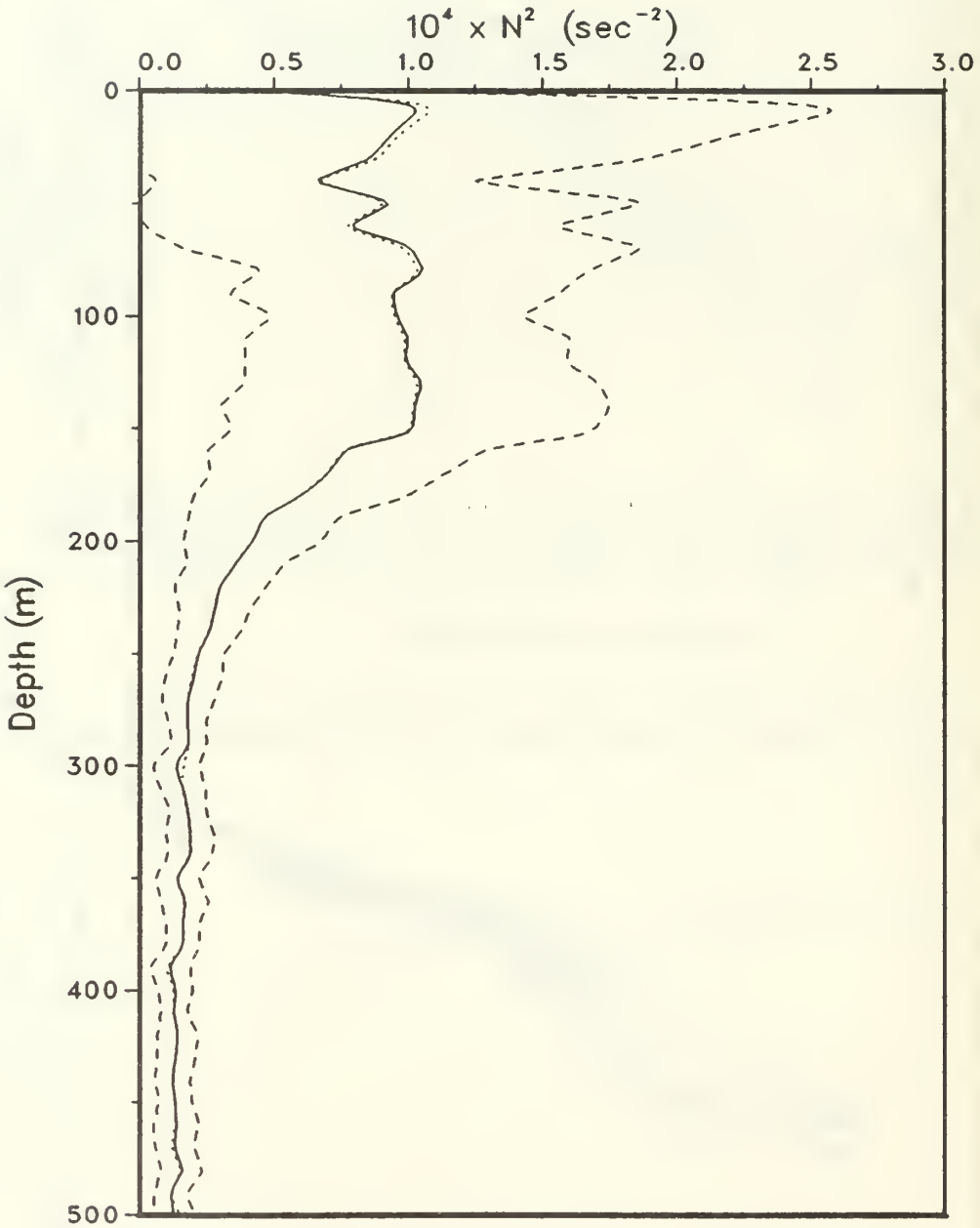


Figure 42: Mean N^2 profile (——), with + and - the standard deviation (----). The N^2 profile from $\overline{T(z)}$ and $\overline{S(z)}$ is also shown (····). (OPTOMA11, Leg DI).

Section 5

OPTOMAll Leg DII

30 June - 10 July, 1984

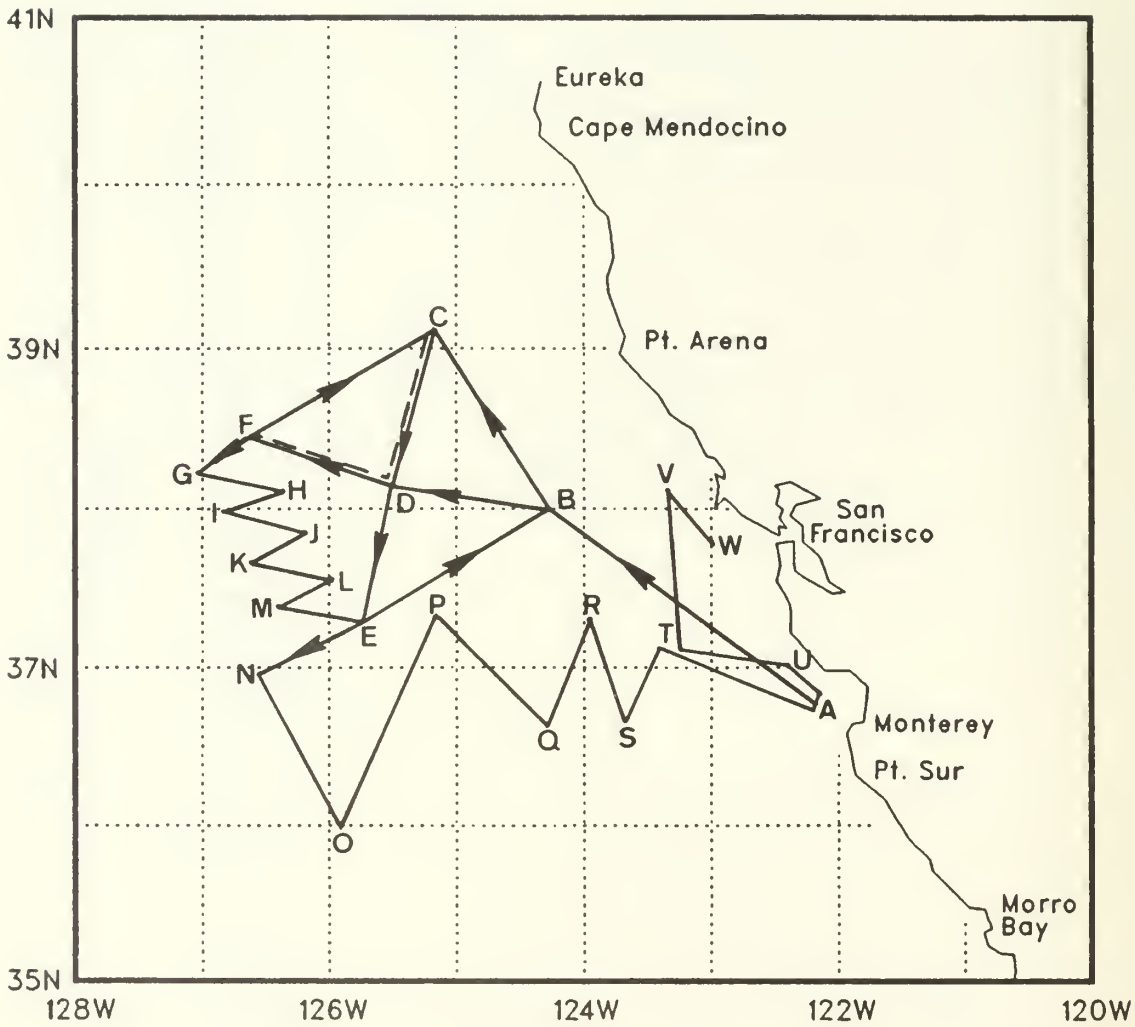


Figure 43: The cruise track for OPTOMA11, Leg DII. The second traversal of the interior semi-diagonals is shown as a broken line.

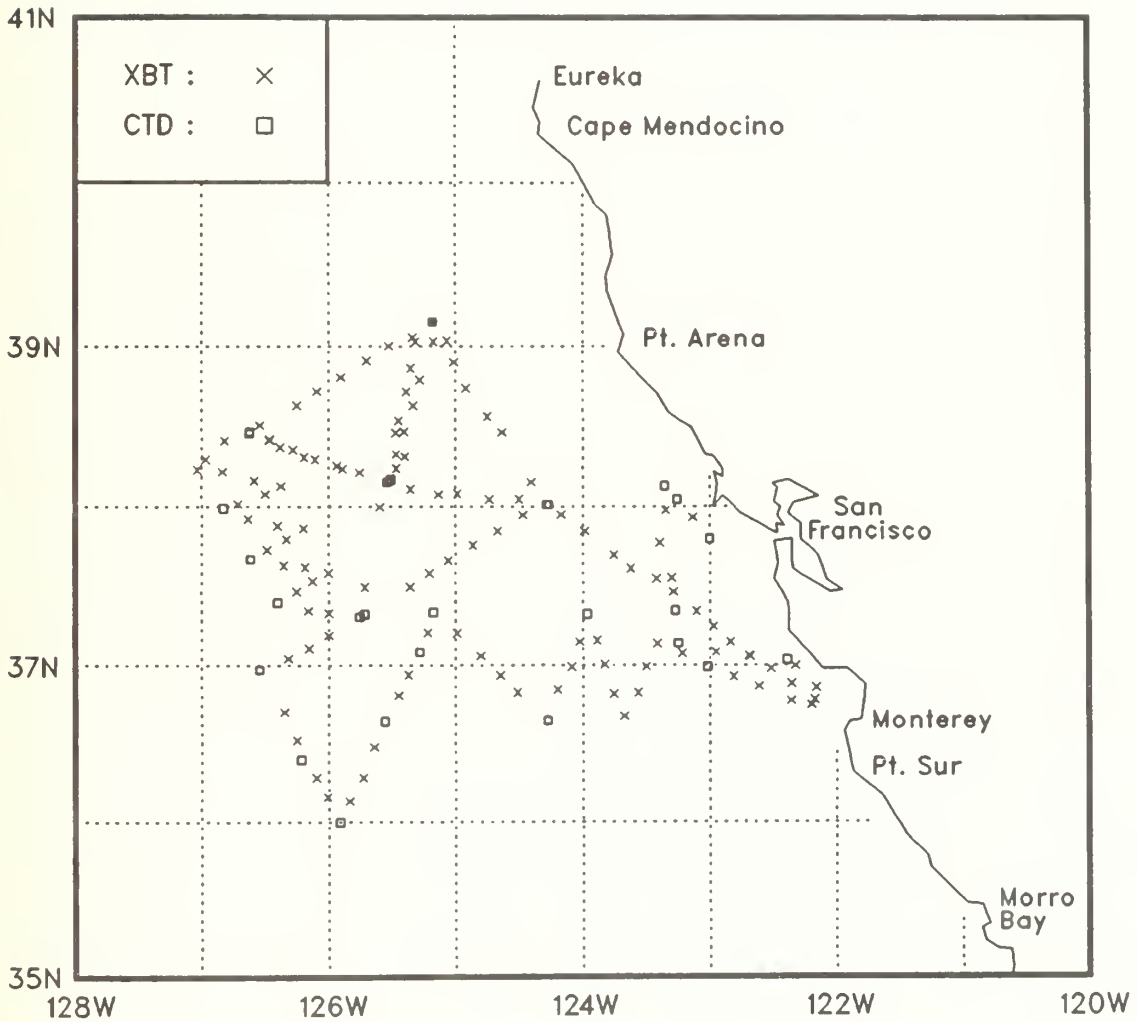


Figure 44: XBT and CTD locations for OPTOMA11, Leg DII.

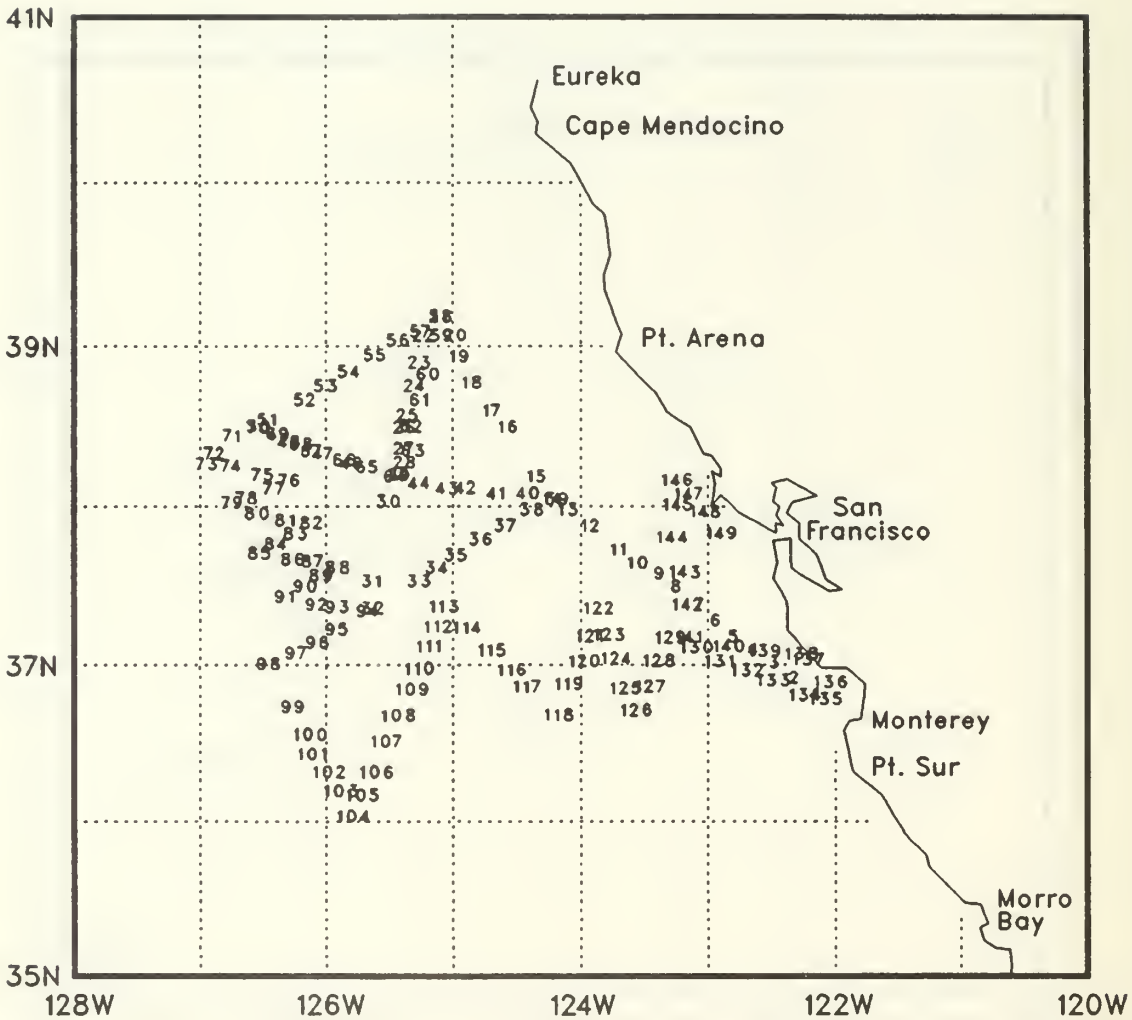


Figure 45: Station numbers for OPTOMA11, Leg DII.

Table 6: Leg DII Station Listing

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
1	XBT	84183	113	36.47	122.10	11.2			
2	XBT	84183	200	36.53	122.21	11.6			
3	XBT	84183	300	36.59	122.31	11.6			
4	XBT	84183	407	37.04	122.41	11.9			
5	XBT	84183	503	37.09	122.50	11.8			
6	XBT	84183	603	37.15	122.58	12.0			
7	XBT	84183	700	37.21	123.06	12.3			
8	XBT	84183	815	37.28	123.17	12.2			
9	XBT	84183	906	37.33	123.25	12.9			
10	XBT	84183	1014	37.37	123.37	13.0			
11	XBT	84183	1105	37.42	123.45	12.6			
12	XBT	84183	1243	37.51	123.59	12.4			
13	XBT	84183	1350	37.57	124.10	12.7			
14	CTD	84183	1514	38.01	124.17	13.0	33.49	13.5	33.50
15	XBT	84183	1722	38.09	124.24	11.1			
16	XBT	84183	2036	38.28	124.38	12.0			
17	XBT	84183	2210	38.34	124.45	13.3			
18	XBT	84184	19	38.45	124.55	14.1			
19	XBT	84184	430	38.54	125.01	13.8			
20	XBT	84184	806	39.02	125.04	13.9			
21	XBT	84184	1106	39.09	125.11	14.0			
22	XBT	84184	1705	39.02	125.19	13.9			
23	XBT	84184	1800	38.52	125.21	14.0			
24	XBT	84184	1850	38.43	125.23	14.2			
25	XBT	84184	1957	38.32	125.27	13.8			
26	XBT	84184	2022	38.28	125.28	14.0			
27	XBT	84184	2102	38.20	125.28	14.0			
28	XBT	84184	2139	38.15	125.28	14.2			
29	CTD	84184	2224	38.10	125.31	13.8	32.62	14.4	*
30	XBT	84184	2344	38.00	125.36	13.8			
31	XBT	84185	228	37.30	125.43	13.6			
32	CTD	84185	335	37.20	125.43	13.2	33.44	13.5	33.04
33	XBT	84185	700	37.30	125.21	13.6			
34	XBT	84185	800	37.35	125.13	13.7			
35	XBT	84185	900	37.40	125.04	13.6			
36	XBT	84185	1000	37.46	124.52	13.7			
37	XBT	84185	1122	37.51	124.40	13.5			
38	XBT	84185	1206	37.57	124.28	13.8			
39	CTD	84185	1313	38.01	124.16	13.8	33.45	14.0	32.68
40	XBT	84185	1444	38.03	124.30	13.6			
41	XBT	84185	1544	38.03	124.44	11.8			
42	XBT	84185	1636	38.05	124.59	12.2			
43	XBT	84185	1722	38.05	125.08	13.9			
44	XBT	84185	1810	38.07	125.21	14.1			
45	CTD	84185	1938	38.10	125.31	14.1	32.65	14.4	32.69

* Data not available

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
46	XBT	84185	2158	38.14	125.54	14.2			
47	XBT	84185	2302	38.18	126.06	14.7			
48	XBT	84186	6	38.22	126.23	14.6			
49	XBT	84186	102	38.25	126.28	14.6			
50	CTD	84186	134	38.28	126.37	14.4	32.66	14.8	32.69
51	XBT	84186	248	38.31	126.32	14.5			
52	XBT	84186	426	38.38	126.15	14.9			
53	XBT	84186	514	38.43	126.05	14.7			
54	XBT	84186	619	38.49	125.54	15.1			
55	XBT	84186	739	38.55	125.42	15.1			
56	XBT	84186	850	39.00	125.31	14.7			
57	XBT	84186	930	39.03	125.20	14.5			
58	CTD	84186	1122	39.09	125.11	14.5	32.56	14.6	32.59
59	XBT	84186	1226	39.02	125.10	14.3			
60	XBT	84186	1336	38.48	125.17	14.2			
61	XBT	84186	1434	38.38	125.20	14.4			
62	XBT	84186	1534	38.28	125.24	14.2			
63	XBT	84186	1627	38.19	125.24	14.5			
64	CTD	84186	1716	38.09	125.32	14.3	32.64	14.9	*
65	XBT	84186	1910	38.13	125.46	14.1			
66	XBT	84186	2000	38.15	125.56	14.8			
67	XBT	84186	2055	38.19	126.12	14.8			
68	XBT	84186	2135	38.21	126.17	14.7			
69	XBT	84186	2230	38.25	126.28	14.9			
70	CTD	84186	2311	38.28	126.37	14.8	32.67	15.2	32.70
71	XBT	84187	44	38.25	126.49	14.9			
72	XBT	84187	138	38.18	126.58	14.6			
73	XBT	84187	221	38.14	127.02	14.7			
74	XBT	84187	319	38.13	126.50	14.5			
75	XBT	84187	430	38.10	126.35	14.4			
76	XBT	84187	517	38.08	126.23	14.4			
77	XBT	84187	621	38.05	126.30	14.1			
78	XBT	84187	722	38.01	126.43	13.9			
79	CTD	84187	800	38.00	126.50	14.1	32.63	14.4	32.64
80	XBT	84187	1021	37.55	126.38	13.4			
81	XBT	84187	1134	37.53	126.24	13.0			
82	XBT	84187	1300	37.52	126.12	14.0			
83	XBT	84187	1346	37.48	126.20	13.4			
84	XBT	84187	1427	37.44	126.29	11.9			
85	CTD	84187	1526	37.40	126.37	12.1	32.73	13.3	32.67
86	XBT	84187	1733	37.38	126.21	12.1			
87	XBT	84187	1816	37.38	126.11	11.9			
88	XBT	84187	1933	37.35	126.00	12.5			
89	XBT	84187	2013	37.32	126.08	12.3			
90	XBT	84187	2058	37.28	126.15	13.8			

* Data not available

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
91	CTD	84187	2139	37.24	126.24	13.9	33.37	14.0	*
92	XBT	84187	2344	37.21	126.10	14.2			
93	XBT	84188	36	37.20	126.00	14.0			
94	CTD	84188	144	37.19	125.46	14.0	33.39	*	*
95	XBT	84188	402	37.12	126.00	14.1			
96	XBT	84188	502	37.07	126.09	14.5			
97	XBT	84188	556	37.03	126.19	15.0			
98	CTD	84188	721	36.59	126.33	15.4	32.91	15.3	32.94
99	XBT	84188	944	36.42	126.21	15.7			
100	XBT	84188	1044	36.32	126.15	15.5			
101	CTD	84188	1134	36.24	126.13	15.5	32.88	15.4	33.33
102	XBT	84188	1328	36.17	126.06	15.5			
103	XBT	84188	1410	36.10	126.01	15.4			
104	CTD	84188	1510	36.00	125.55	15.6	32.90	15.9	32.76
105	XBT	84188	1744	36.08	125.50	15.4			
106	XBT	84188	2025	36.17	125.44	15.6			
107	XBT	84188	2308	36.29	125.39	15.5			
108	CTD	84189	100	36.39	125.34	15.5	32.88	15.8	32.91
109	XBT	84189	346	36.49	125.27	14.5			
110	XBT	84189	531	36.57	125.22	14.3			
111	CTD	84189	752	37.05	125.17	12.8	32.91	12.7	32.91
112	XBT	84189	1056	37.13	125.13	13.4			
113	CTD	84189	1300	37.20	125.11	12.8	33.25	13.0	33.28
114	XBT	84189	1436	37.12	124.59	13.1			
115	XBT	84189	1543	37.04	124.48	13.9			
116	XBT	84189	1649	36.56	124.39	14.2			
117	XBT	84189	1755	36.50	124.31	13.1			
118	CTD	84189	1919	36.39	124.16	13.4	32.97	13.7	32.98
119	XBT	84189	2136	36.51	124.12	14.1			
120	XBT	84189	2342	37.00	124.05	14.0			
121	XBT	84190	110	37.09	124.01	13.9			
122	CTD	84190	300	37.20	123.58	13.3	33.43	13.0	33.28
123	XBT	84190	440	37.10	123.53	14.4			
124	XBT	84190	534	37.01	123.49	13.9			
125	XBT	84190	634	36.49	123.45	14.7			
126	XBT	84190	731	36.41	123.40	14.6			
127	XBT	84190	923	36.50	123.34	14.7			
128	XBT	84190	1057	37.00	123.30	14.7			
129	XBT	84190	555	37.09	123.24	14.2			
130	XBT	84190	1400	37.05	123.13	14.0			
131	CTD	84190	1510	37.00	123.01	14.4	33.21	14.3	33.23
132	XBT	84190	1719	36.56	122.48	14.0			
133	XBT	84190	1814	36.52	122.37	13.3			
134	XBT	84190	1932	36.47	122.21	13.9			
135	XBT	84190	2014	36.45	122.12	14.1			

* Data not available

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
136	XBT	84191	55	36.52	122.09	14.2			
137	XBT	84191	202	37.00	122.19	13.4			
138	CTD	84190	247	37.02	122.23	12.5	33.70	12.8	33.47
139	XBT	84191	440	37.04	122.41	12.8			
140	XBT	84191	607	37.05	122.57	14.0			
141	CTD	84191	814	37.09	123.15	14.2	33.25	14.3	33.26
142	CTD	84191	1314	37.21	123.16	12.5	33.52	*	*
143	XBT	84191	1921	37.33	123.18	12.8			
144	XBT	84191	2239	37.47	123.23	12.4			
145	XBT	84192	122	37.59	123.21	11.7			
146	CTD	84192	318	38.08	123.21	10.6	33.73	10.2	33.75
147	CTD	84192	411	38.03	123.15	12.7	33.60	10.8	33.38
148	XBT	84192	538	37.56	123.08	11.9			
149	CTD	84192	710	37.48	123.00	11.8	33.70	12.0	*

* Data not available

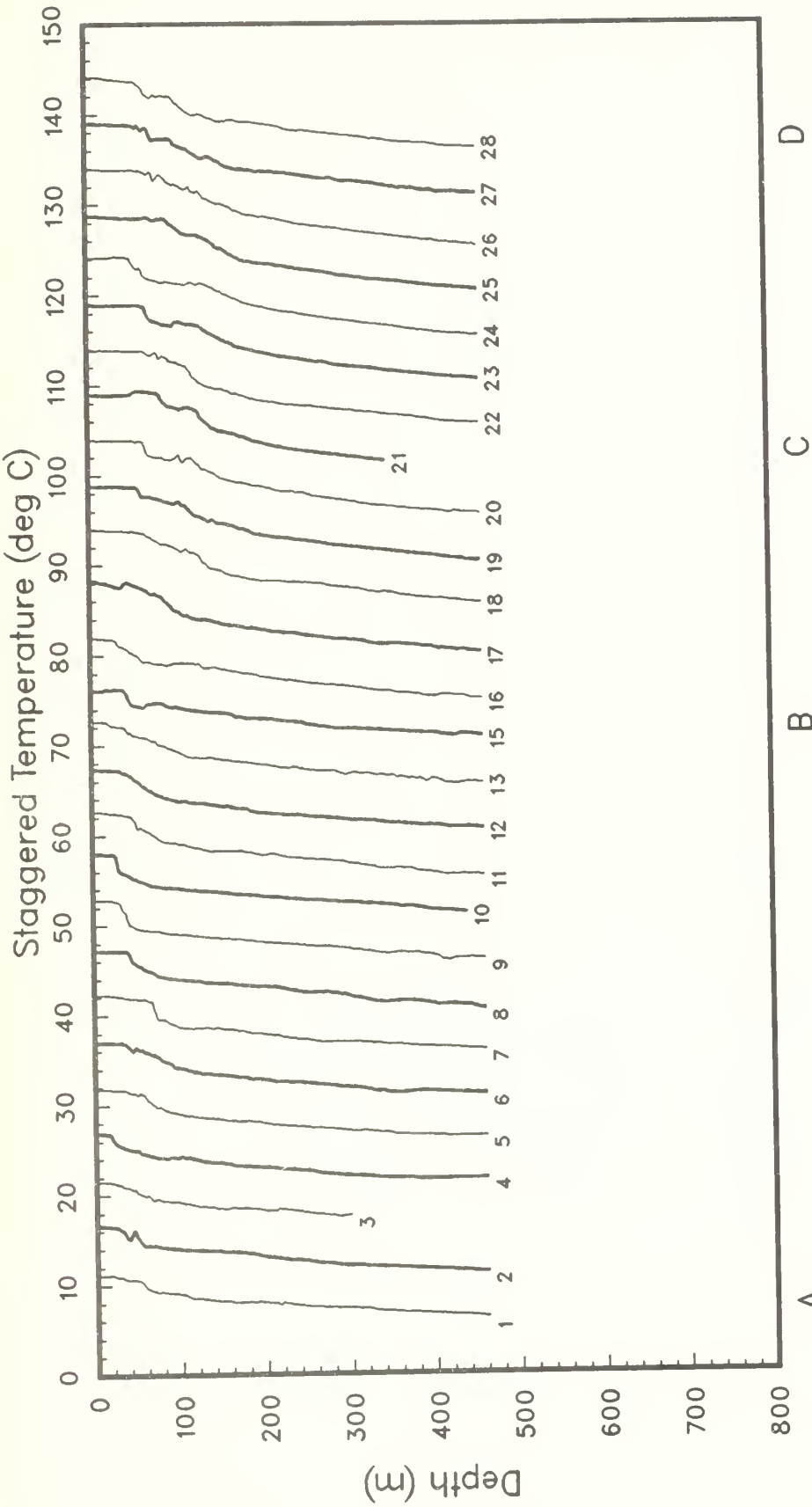


Figure 46(a): XBT temperature profiles, staggered by multiples of 5C. (OPTOMA11, Leg DII).

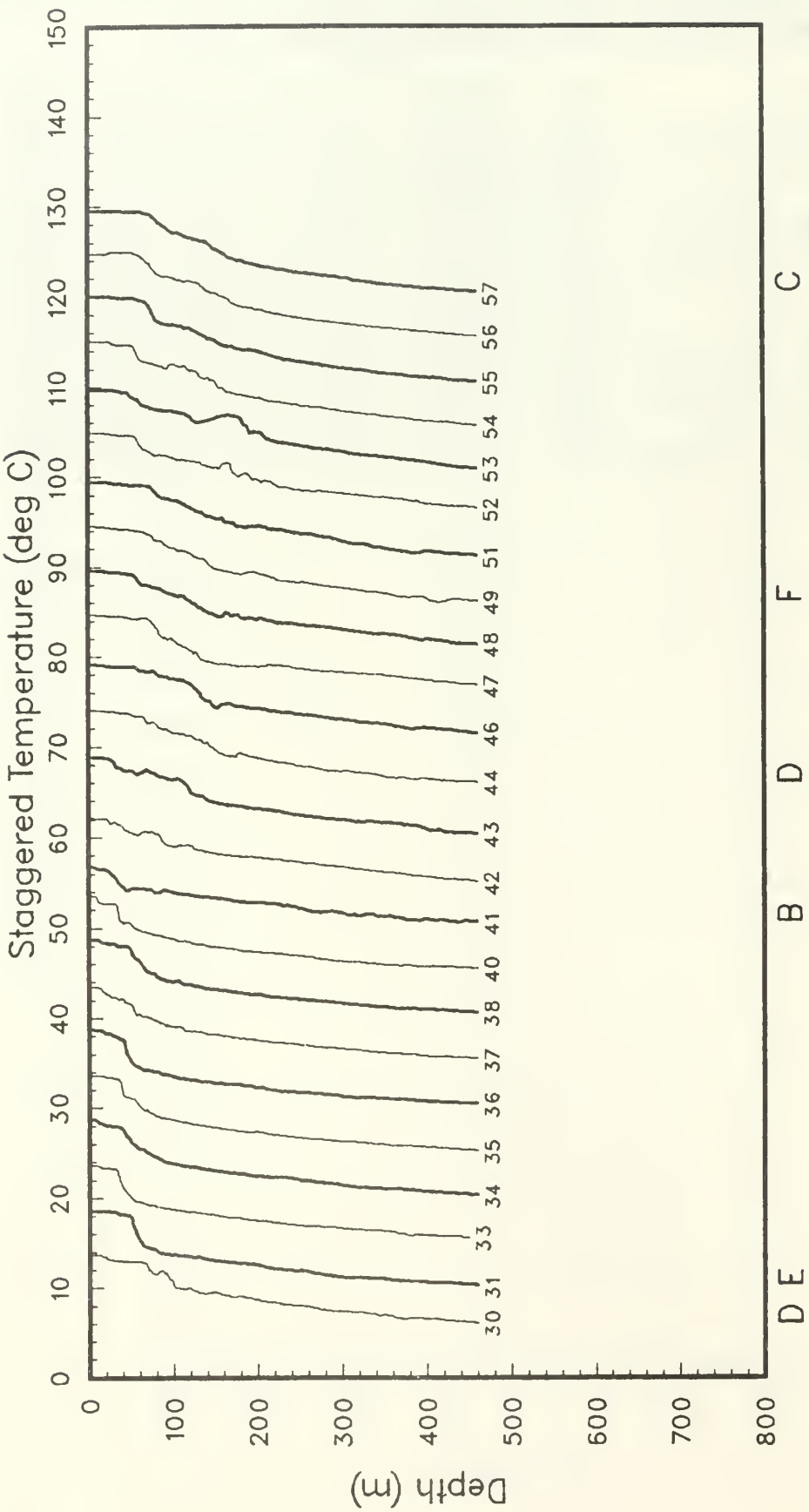

Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
Depth (m)
0
100
200
300
400
500
600
700
800
30 31 33 34 35 36 37 38 40 41 42 43 44 46 47 48 49 51 52 53 54 55 56 57
D E
B
D
F
C

Figure 46(b).

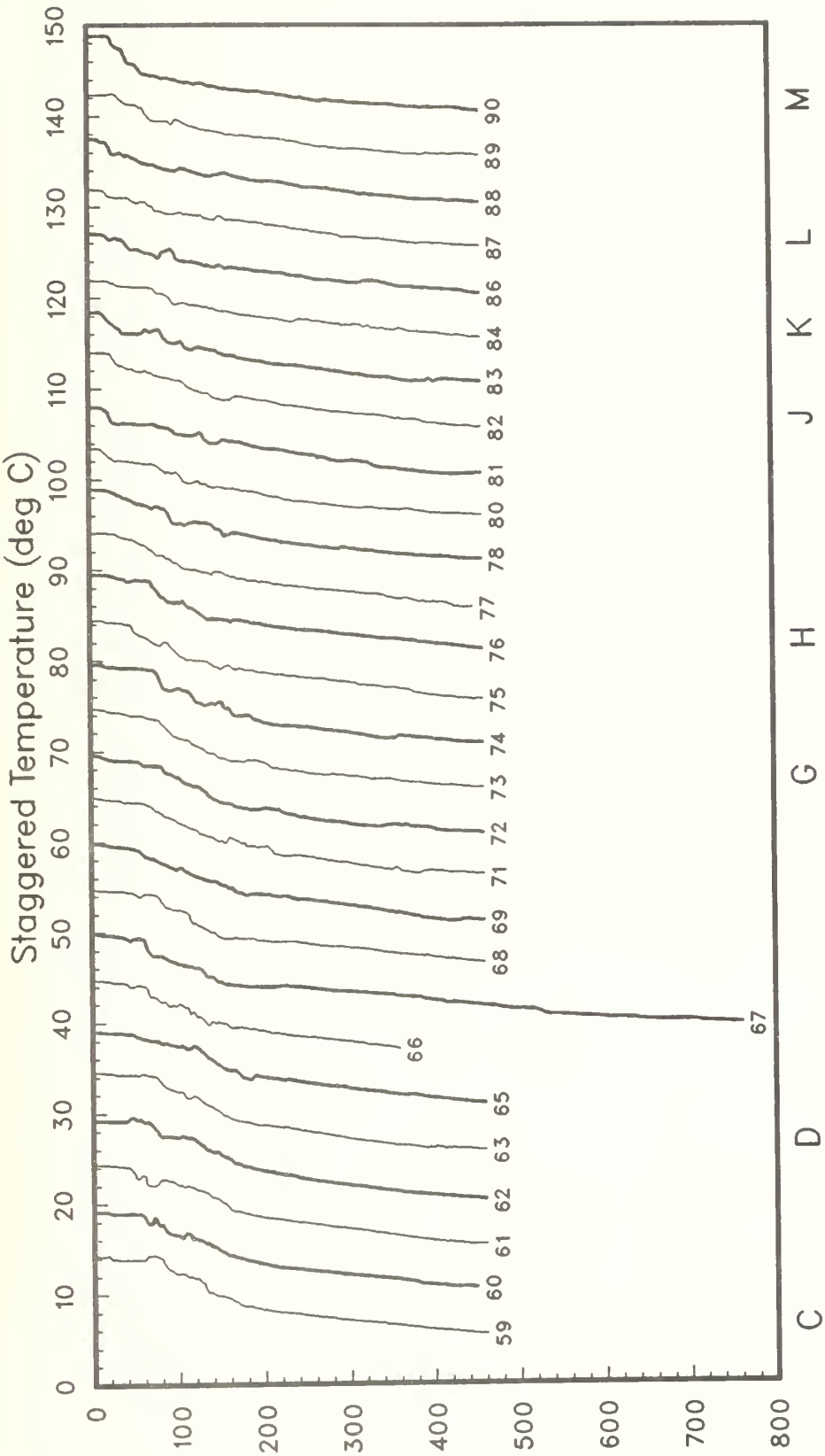

Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
Depth (m)
0
100
200
300
400
500
600
700
800
59
60
61
62
63
65
66
67
68
69
71
72
73
74
75
76
77
78
80
81
82
83
84
86
87
88
89
90
C
D
G
H
J
K
L
M

Figure 46(c).

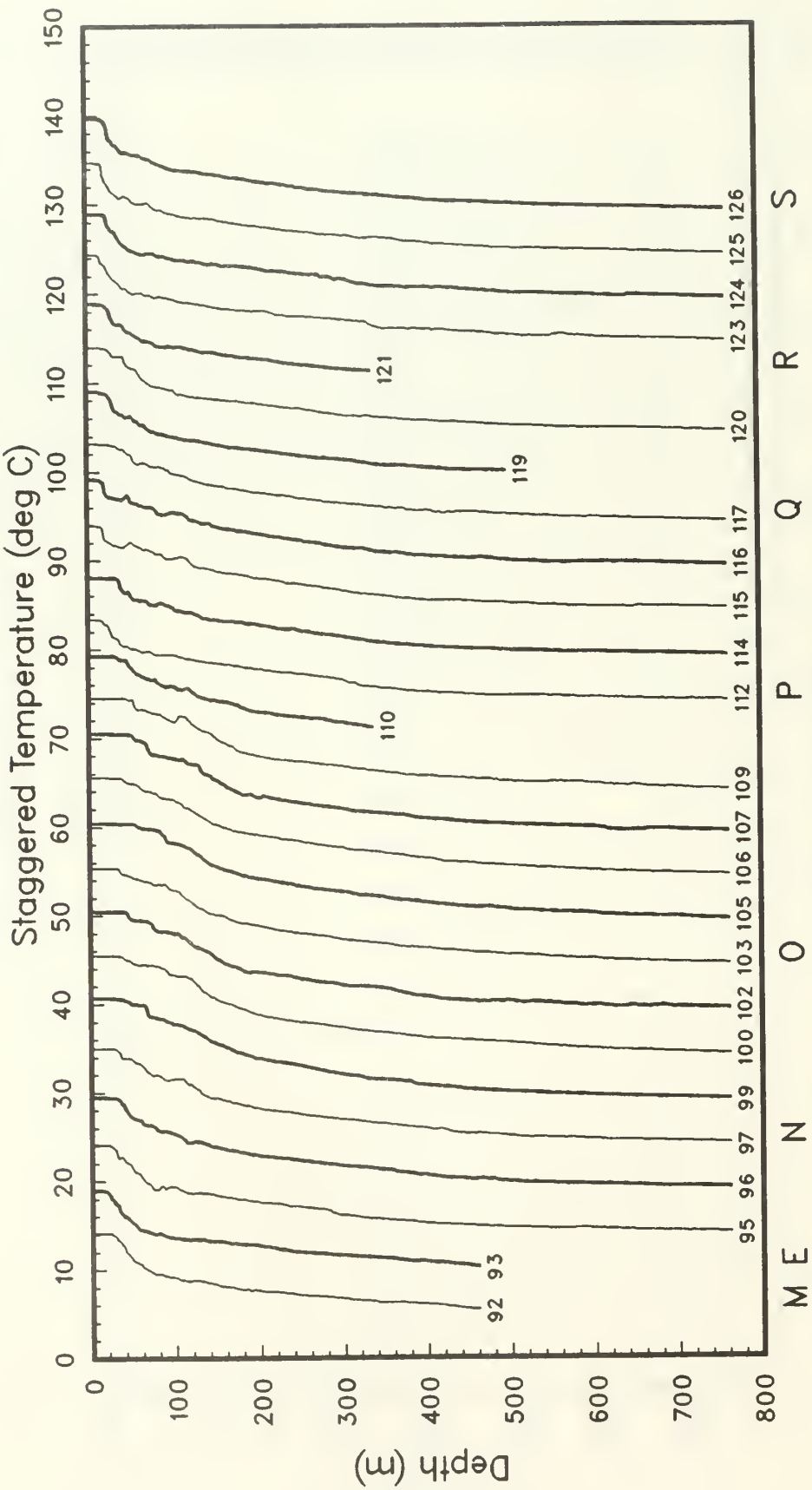

Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
Depth (m)
0
100
200
300
400
500
600
700
800
M E N O P Q R S
92 93 95 96 97 99 100 102 103 105 106 107 109 110 112 114 115 116 117 119 120 121 123 124 125 126

Figure 46(d).

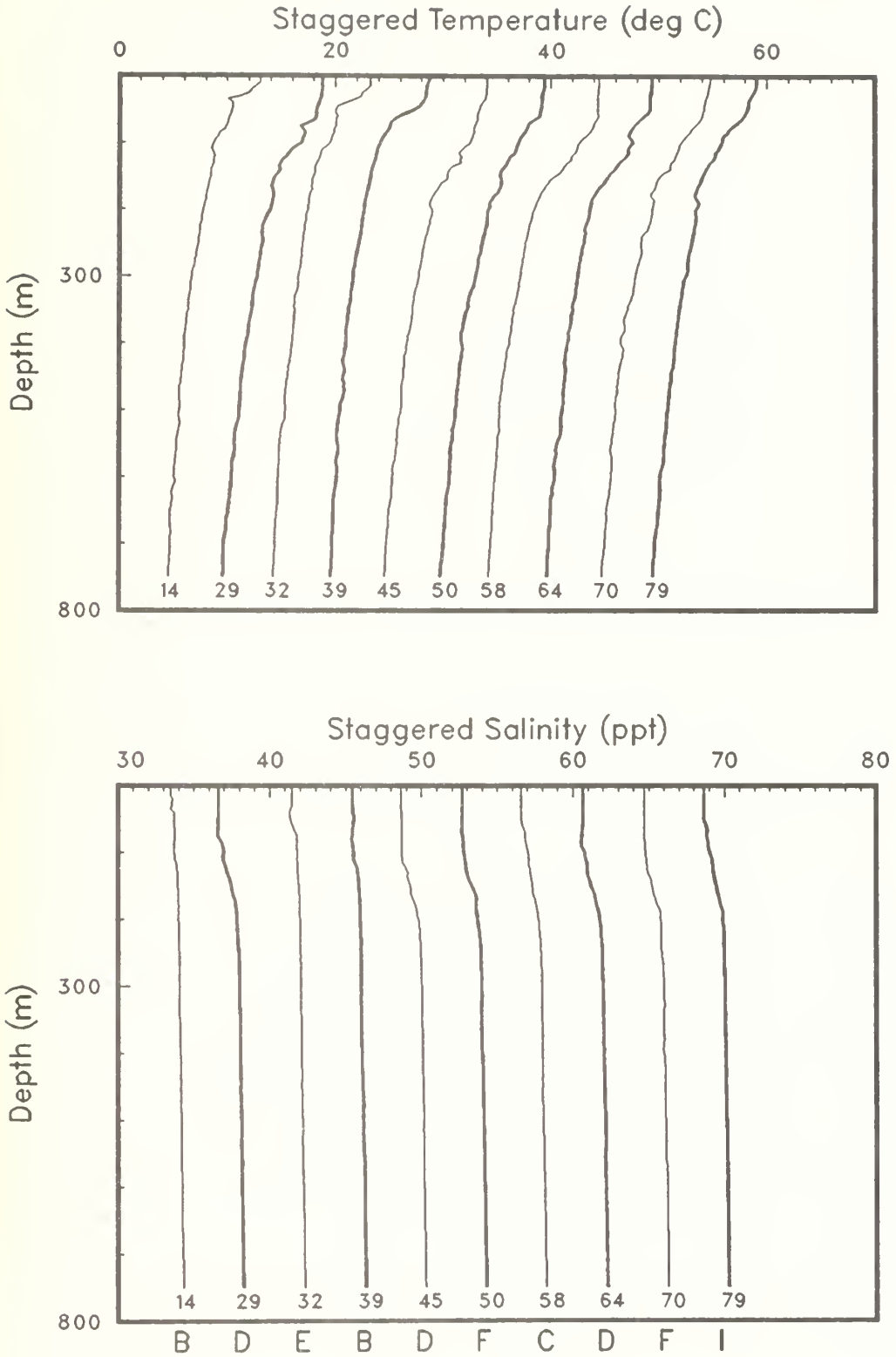


Figure 47(a): CTD temperature profiles, staggered by multiples of 5C, and salinity profiles, staggered by multiples of 4 ppt. (OPTOMA11, Leg DII).

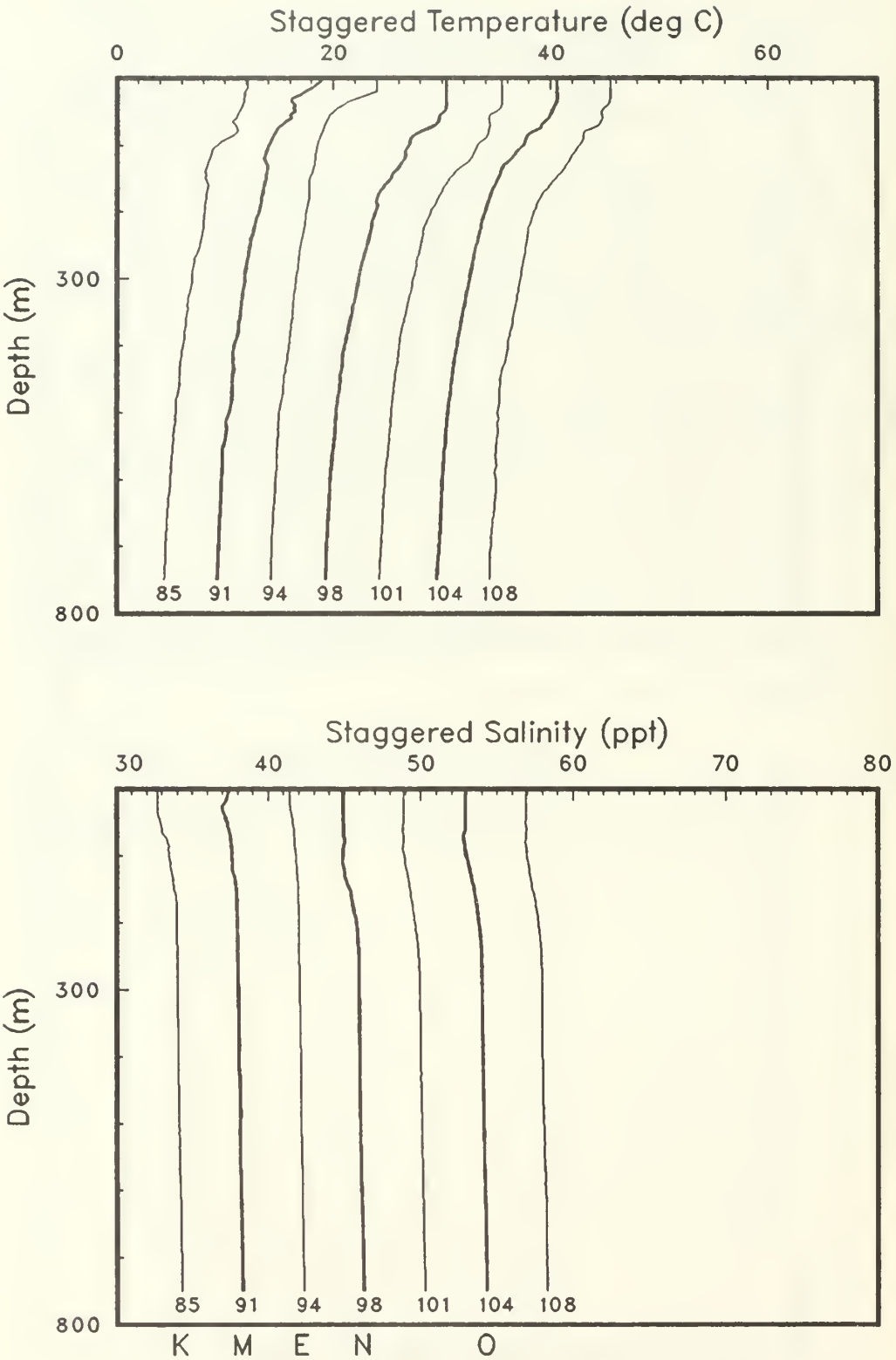

Staggered Temperature (deg C)
0
20
40
60
Depth (m)
300
800
85
91
94
98
101
104
108
Staggered Salinity (ppt)
30
40
50
60
70
80
Depth (m)
300
800
85
91
94
98
101
104
108
K
M
E
N
O

Figure 47(b).

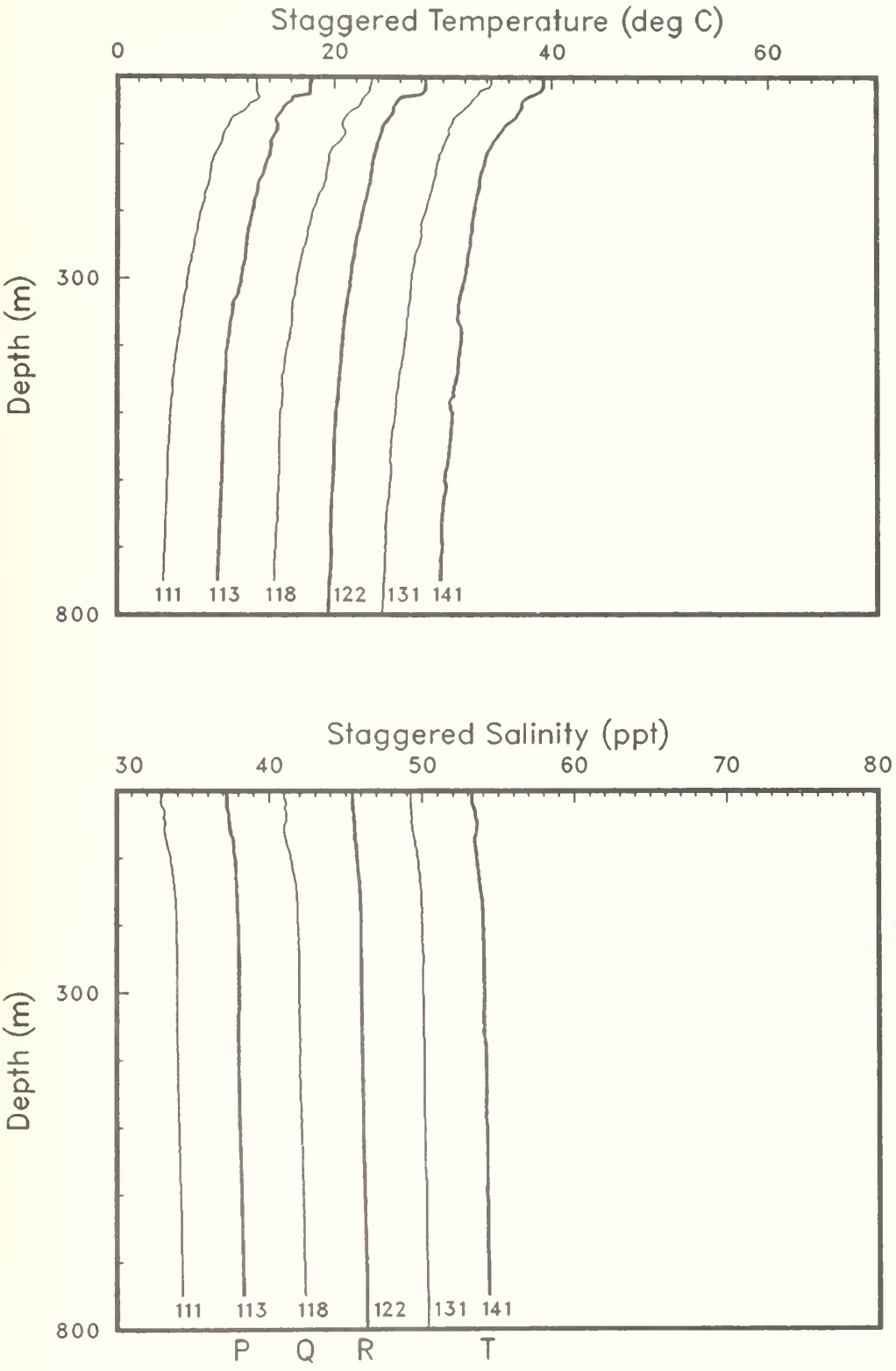

Staggered Temperature (deg C)
0
20
40
60
Depth (m)
300
800
111
113
118
122
131
141
Staggered Salinity (ppt)
30
40
50
60
70
80
Depth (m)
300
800
111
113
118
122
131
141
P
Q
R
T

Figure 47(c).

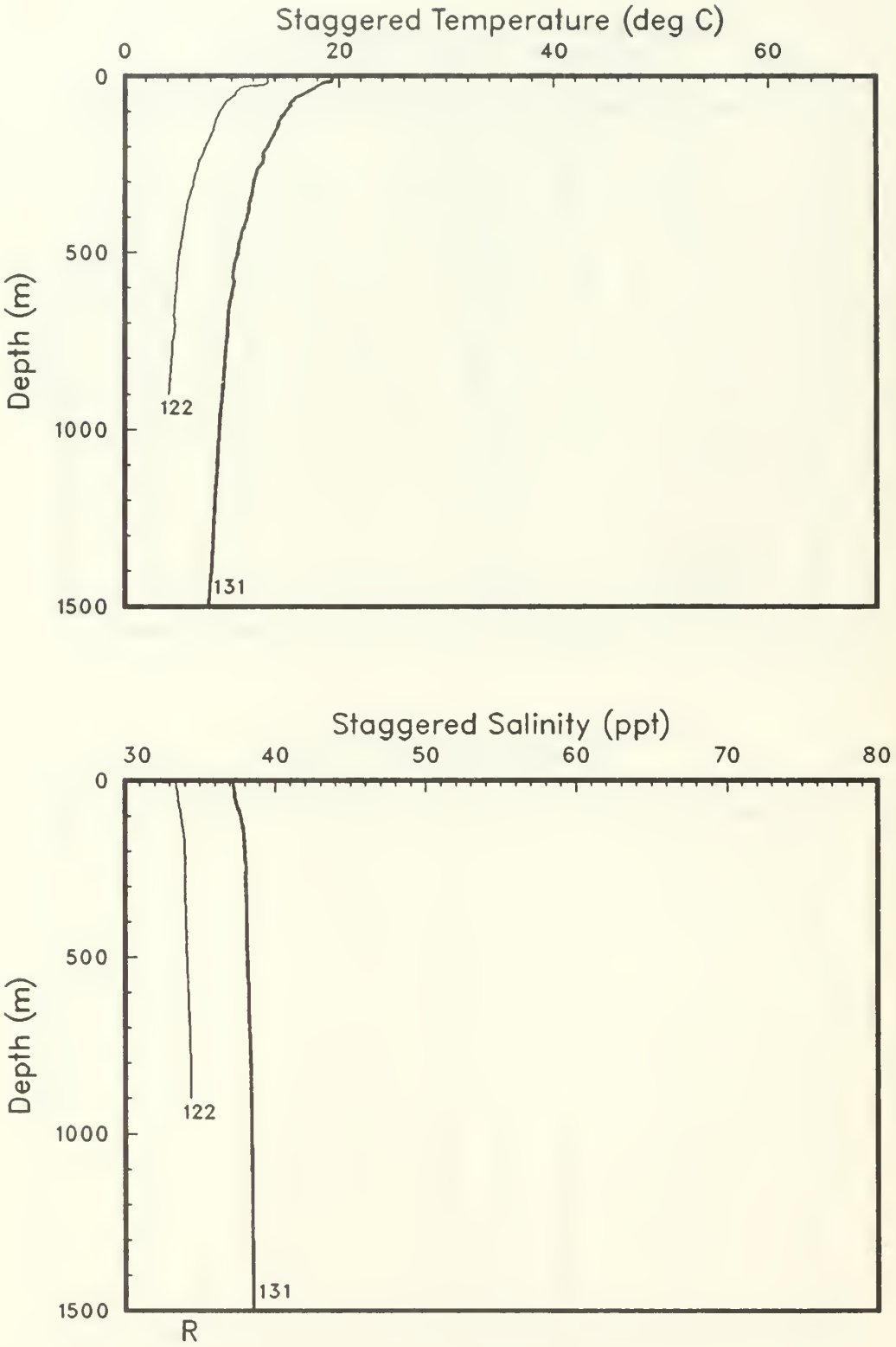


Figure 48: CTD casts deeper than 800m. (OPTOMA11, Leg DII).

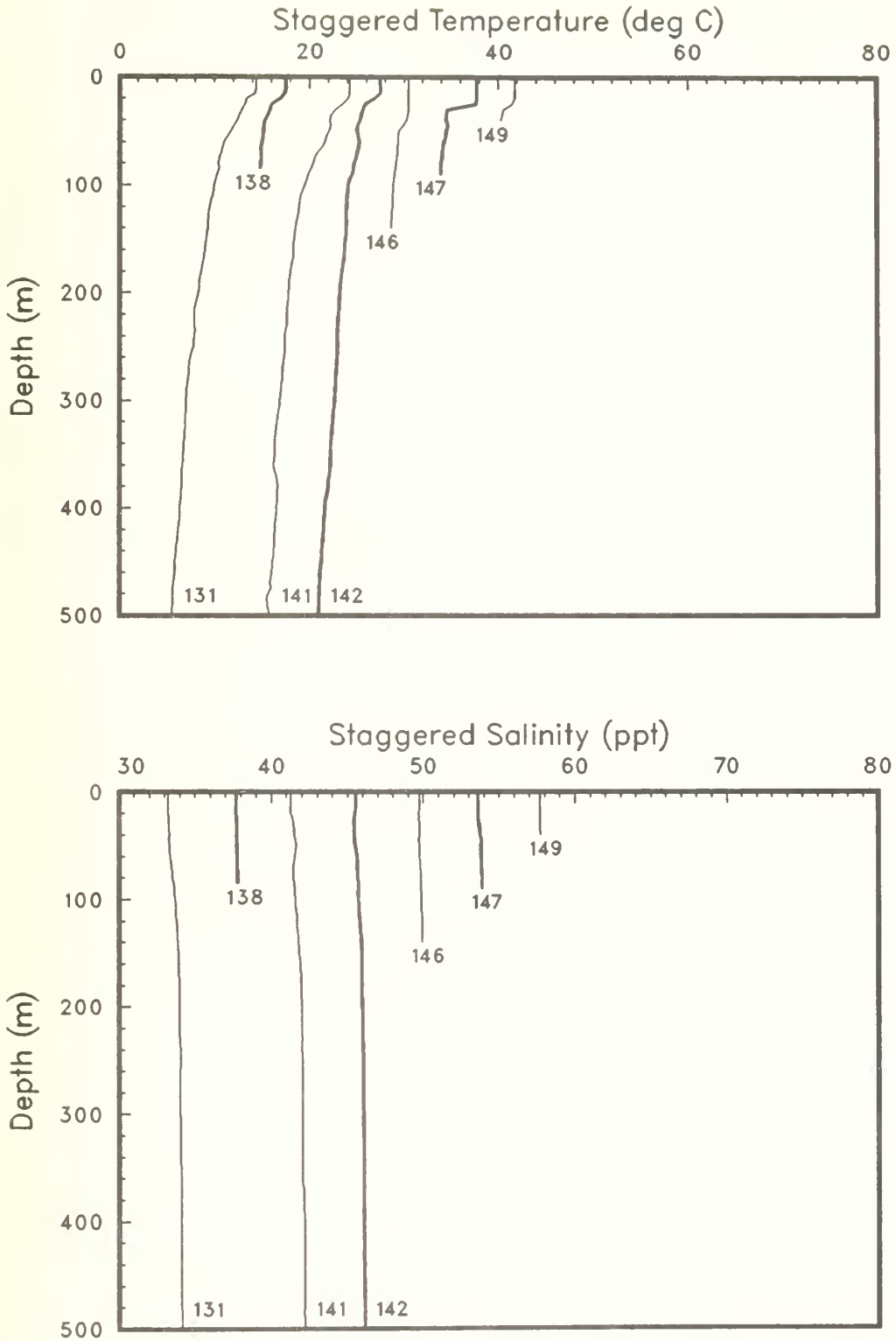


Figure 49: Nearshore CTD casts plotted to 500m or less. (OPTOMA11, Leg DII).

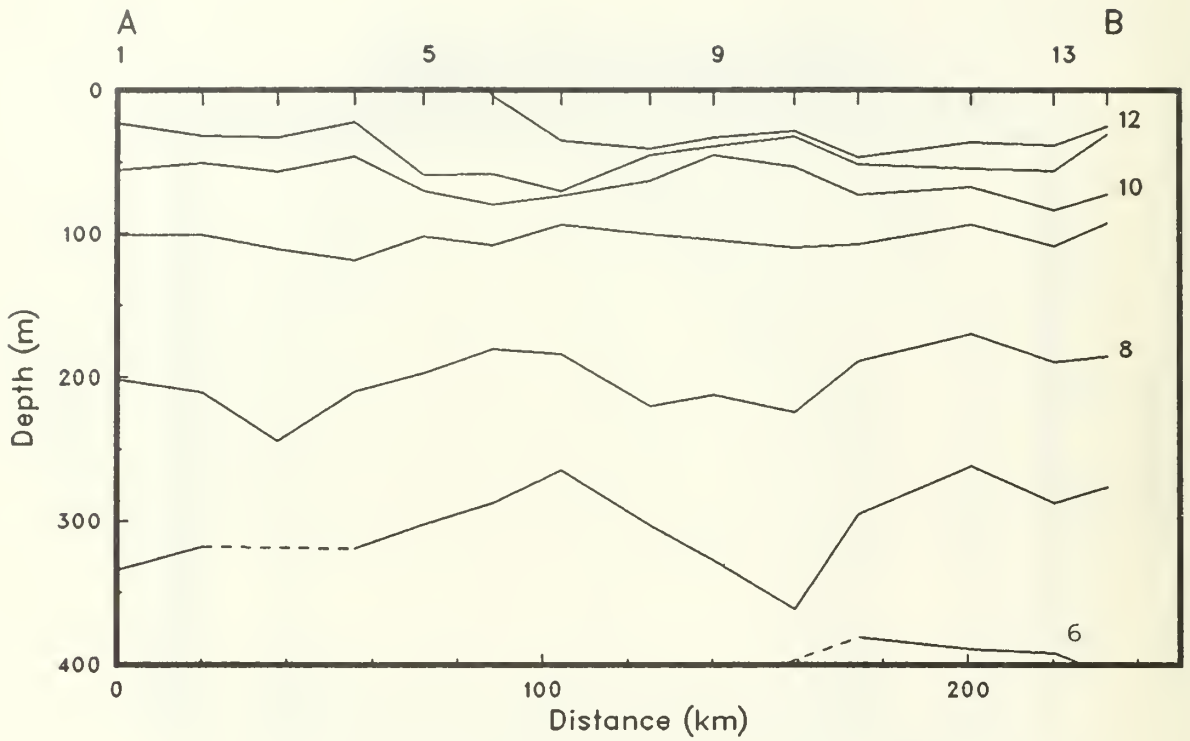


Figure 50(a): Along-track isotherms. Tick marks along the upper horizontal axis show station positions. Some station numbers are given. Dashed lines are used if the cast was too shallow. (OPTOMA11, Leg DII).

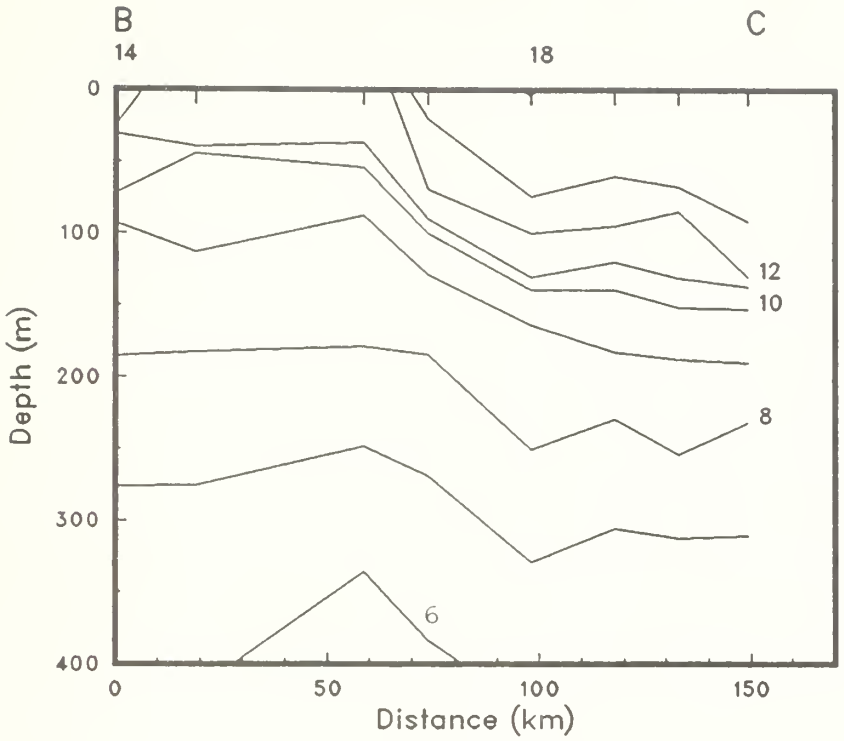


Figure 50(b).

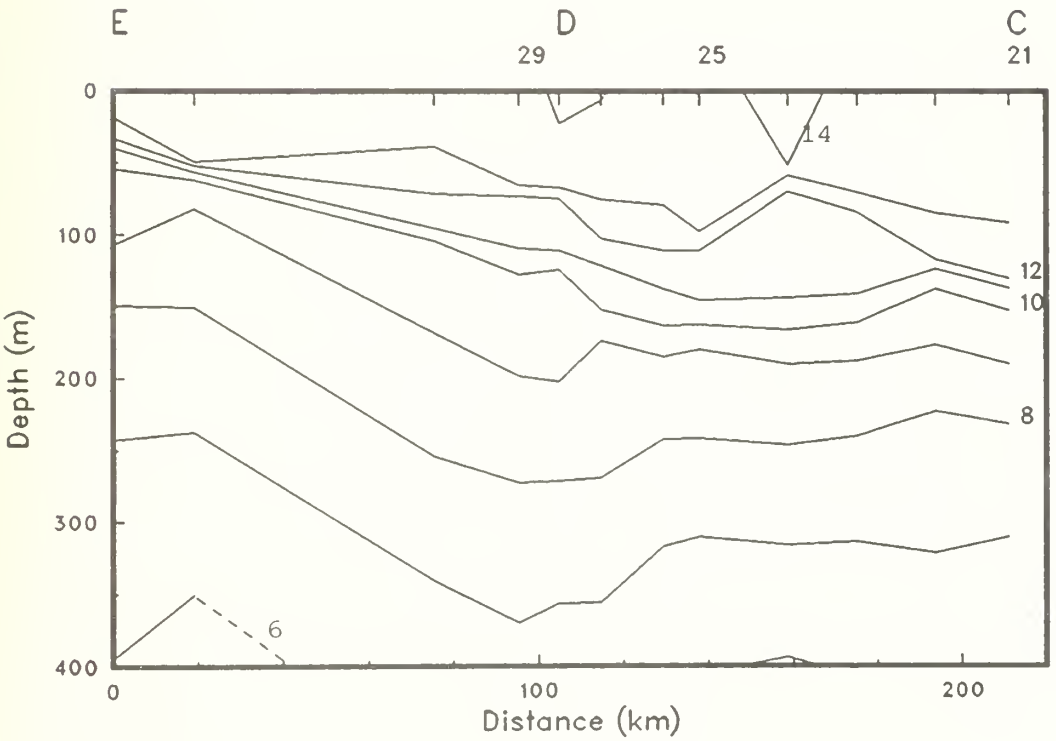


Figure 50(c).

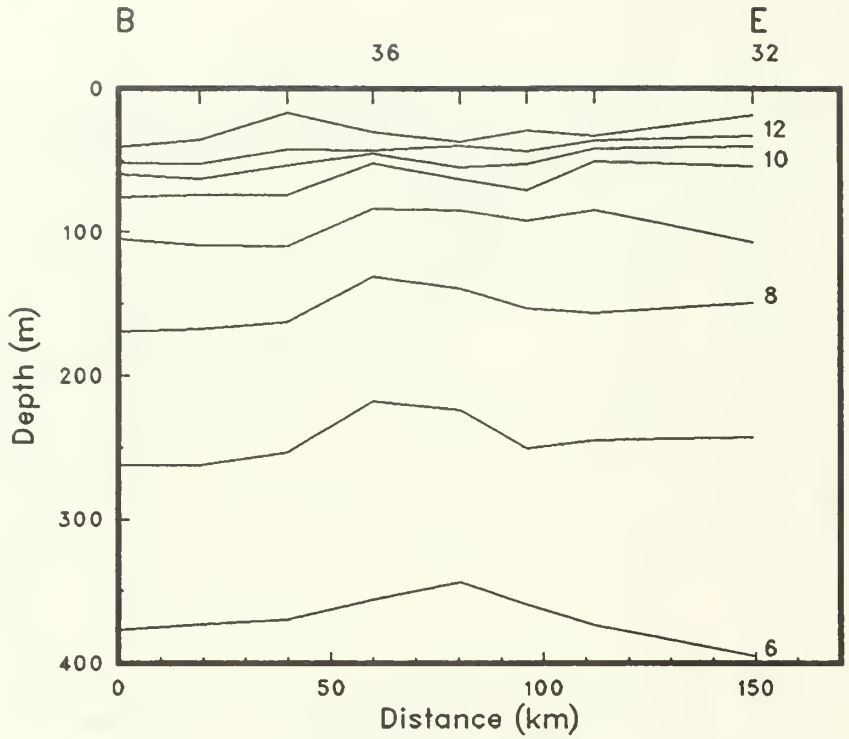


Figure 50(d).

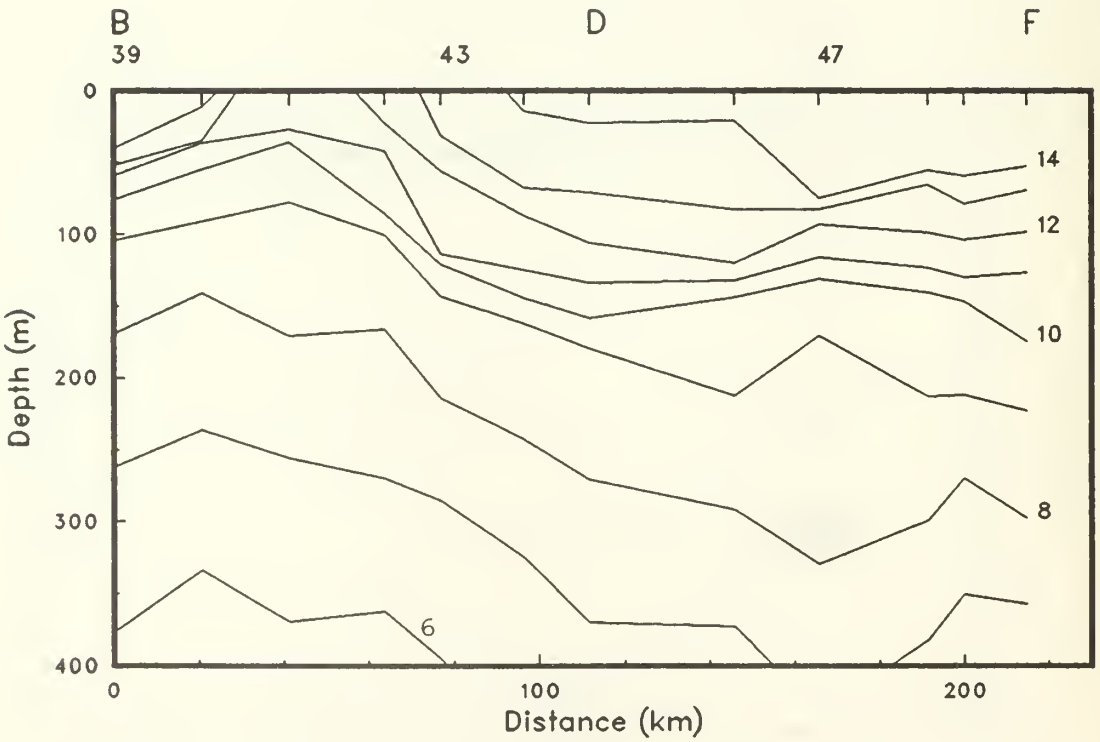


Figure 50(e).

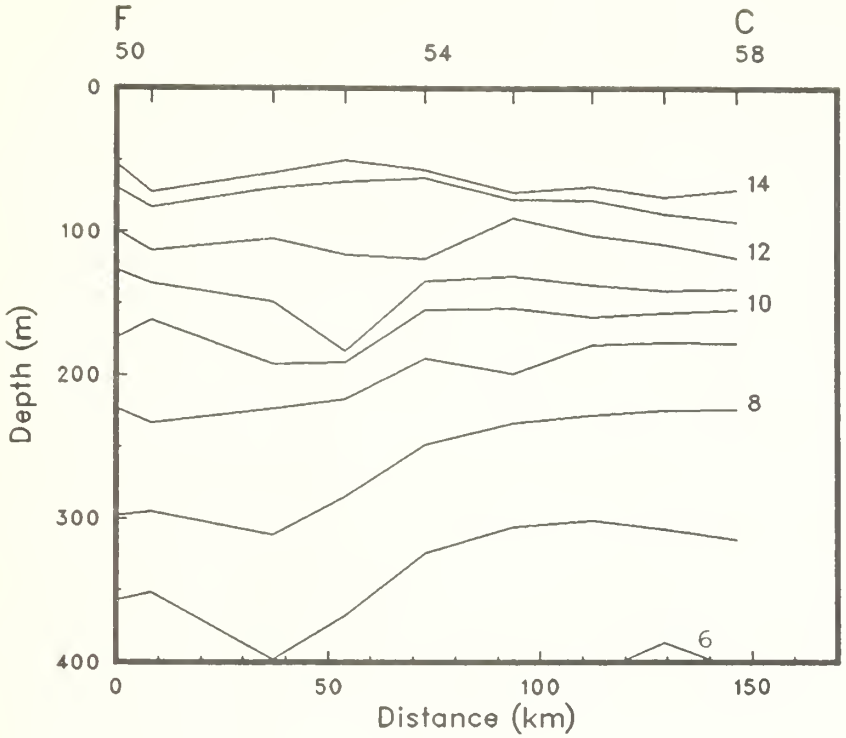


Figure 50(f).

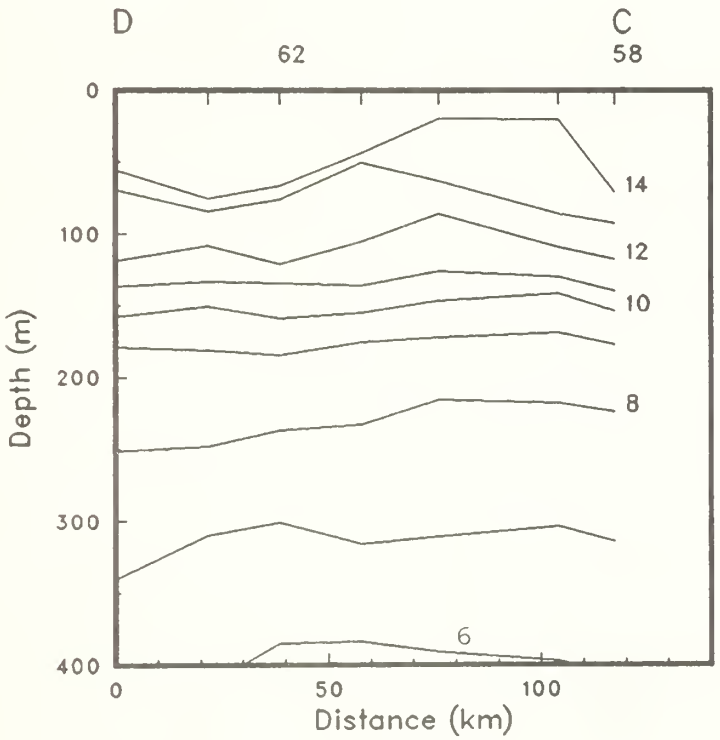


Figure 50(g).

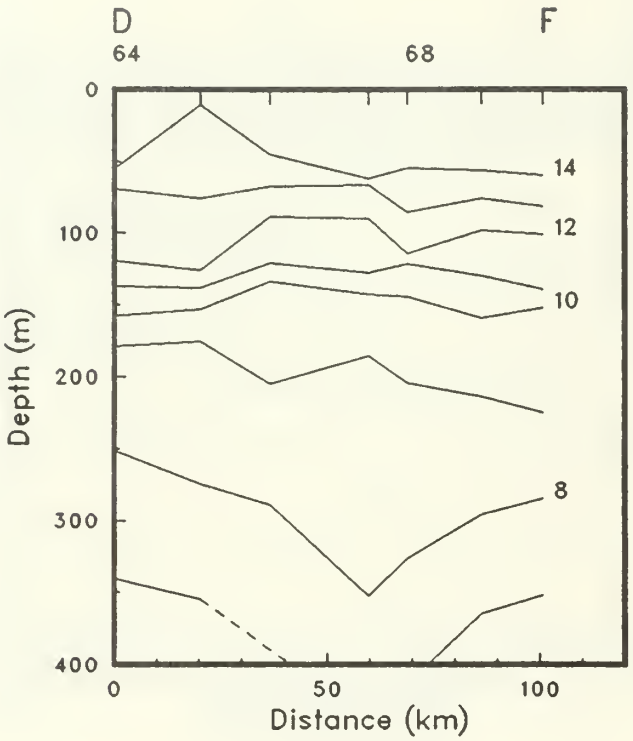


Figure 50(h).

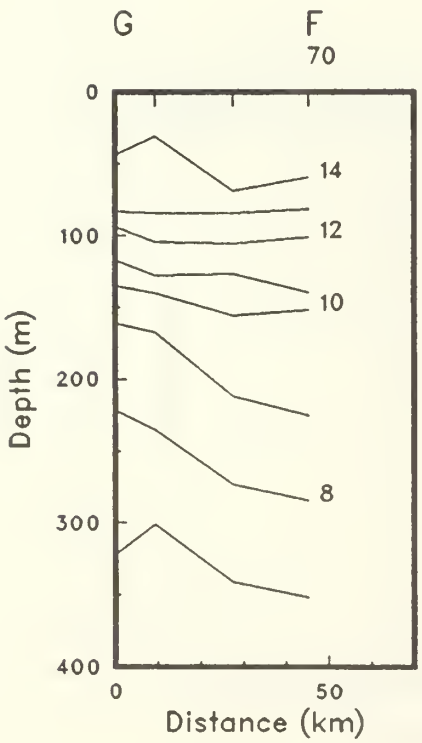


Figure 50(i).

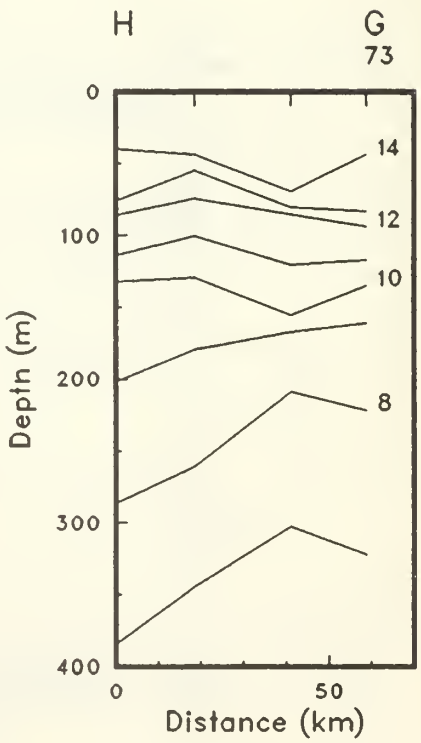


Figure 50(j).

Figure 50(k).

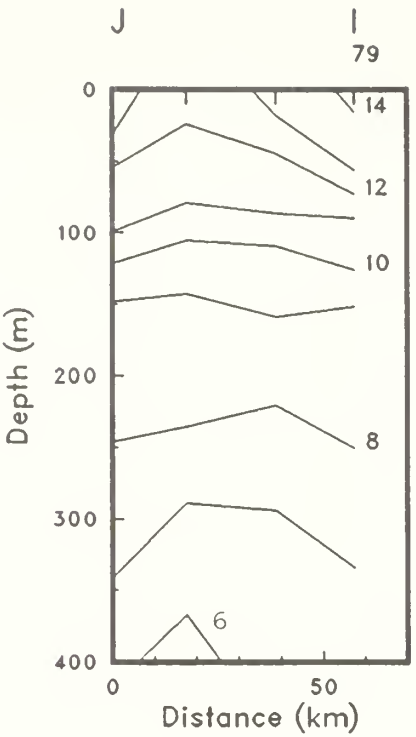


Figure 50(l).

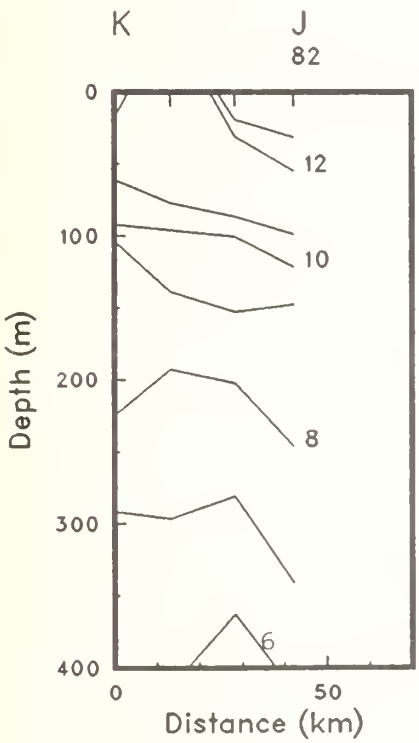


Figure 50(m).

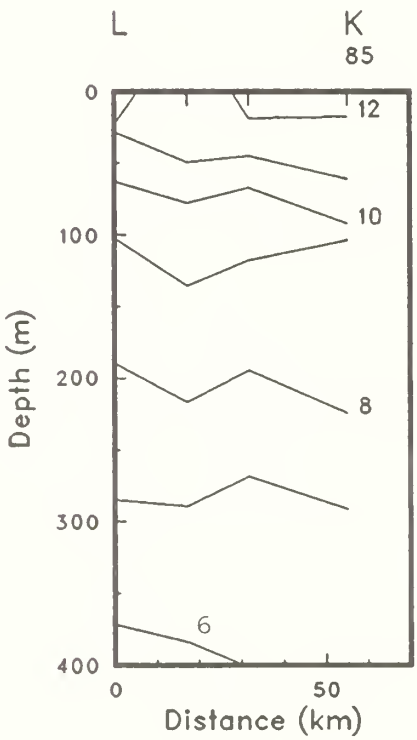


Figure 50(n).

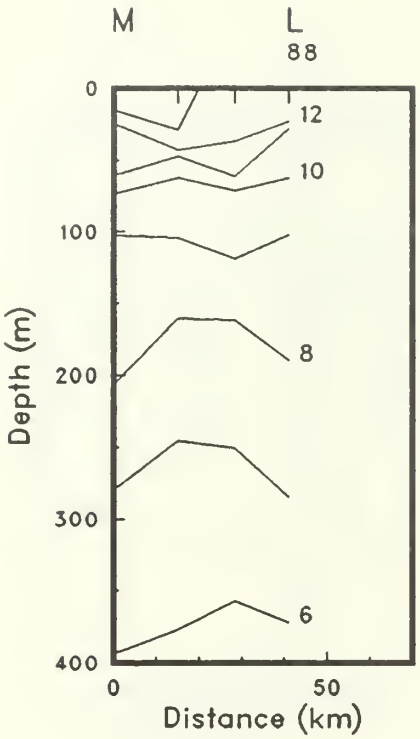


Figure 50(o).

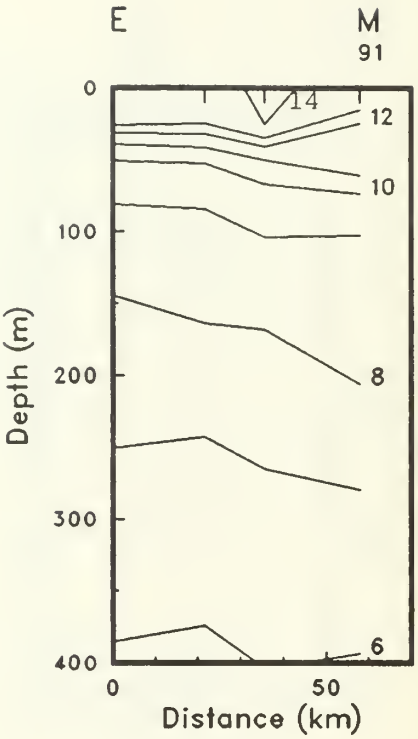


Figure 50(p).

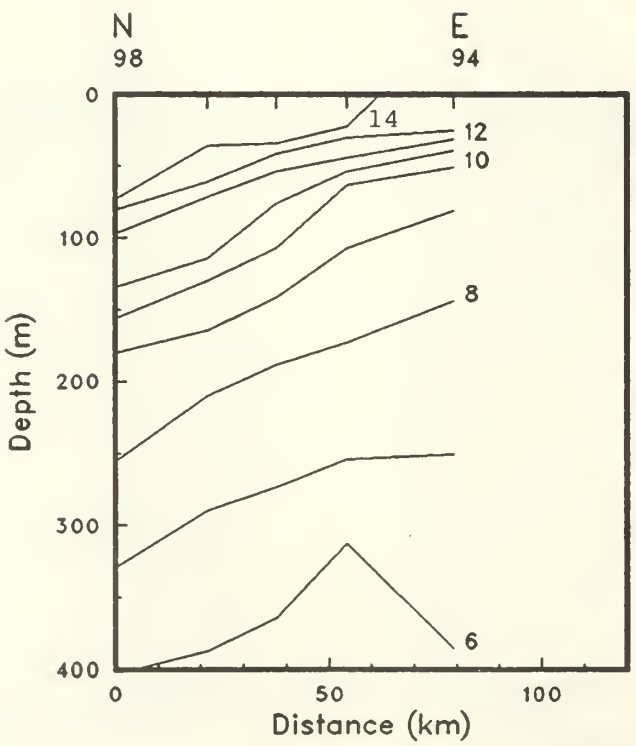


Figure 50(q).

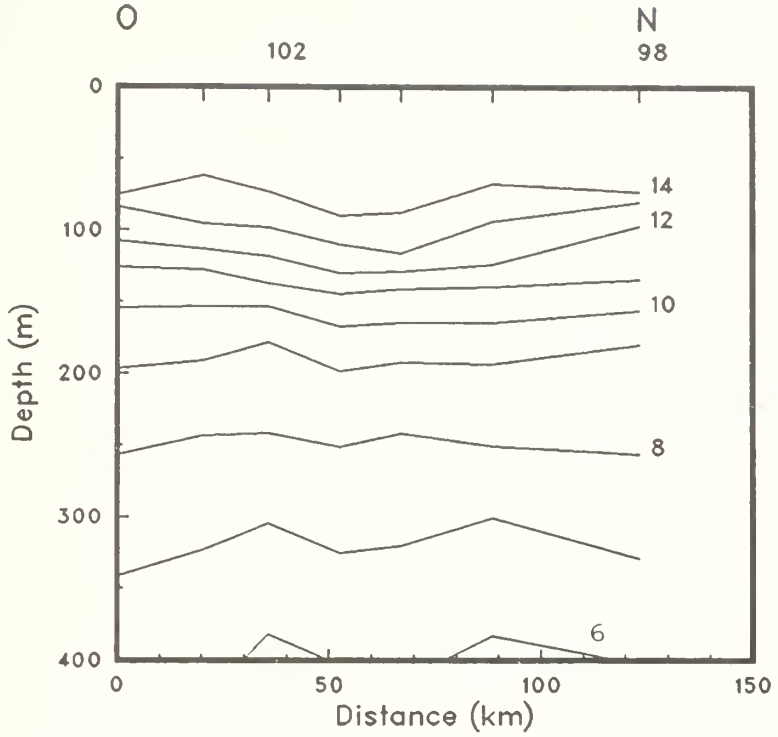


Figure 50(r).

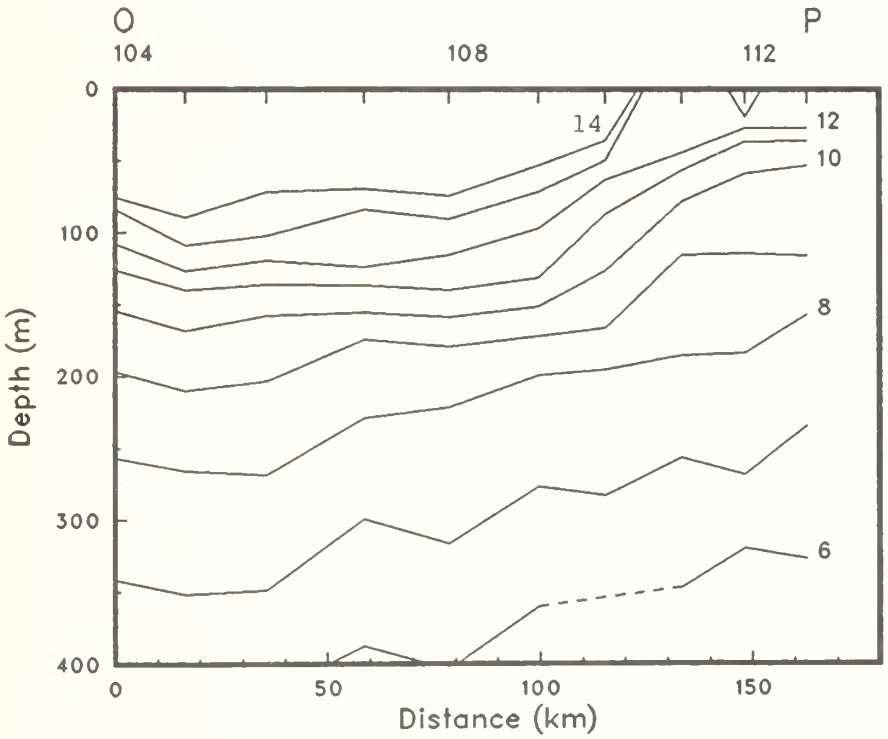


Figure 50(s).

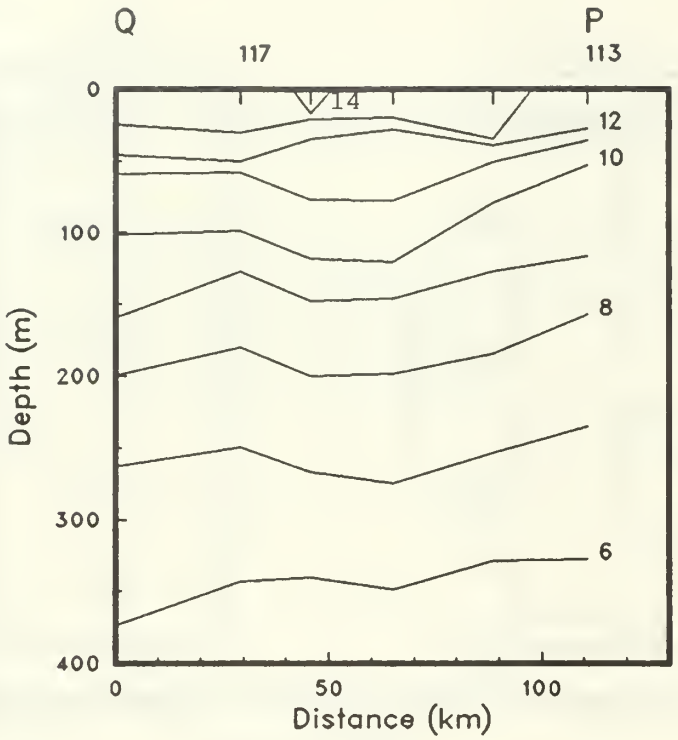


Figure 50(t).

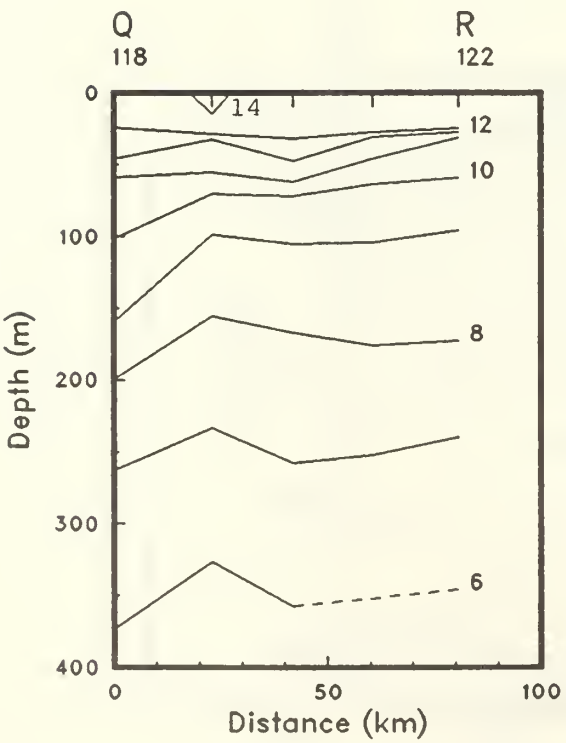


Figure 50(u).

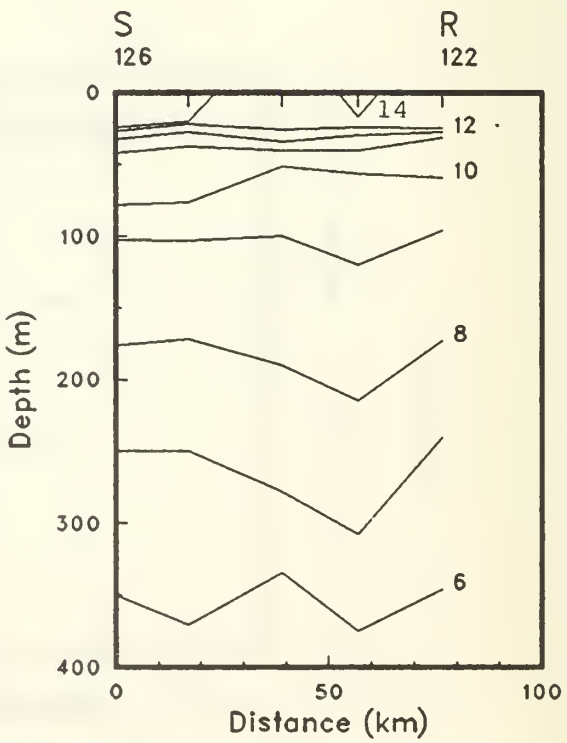


Figure 50(v).

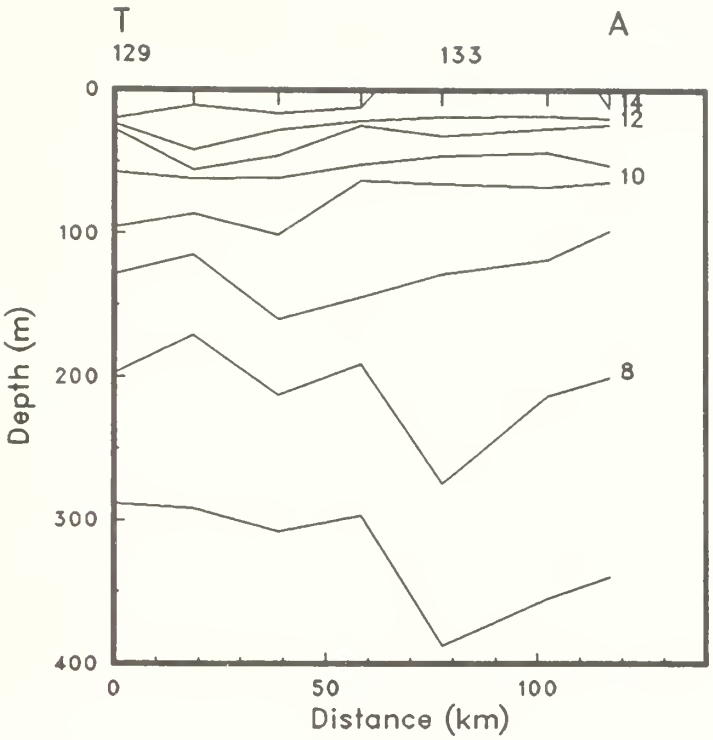


Figure 50(w).

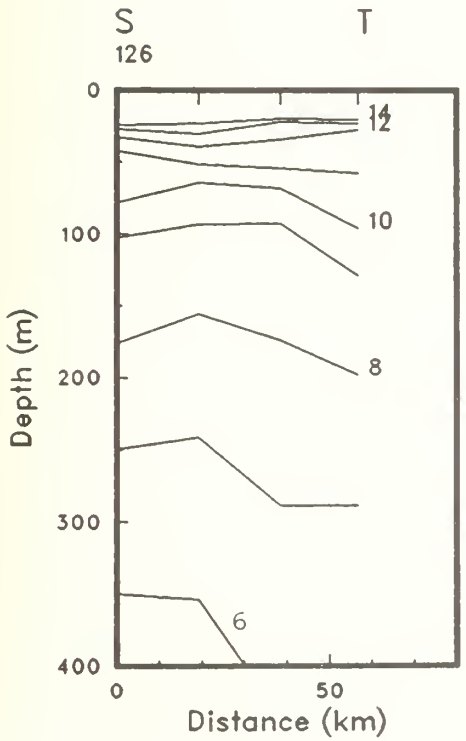


Figure 50(x).

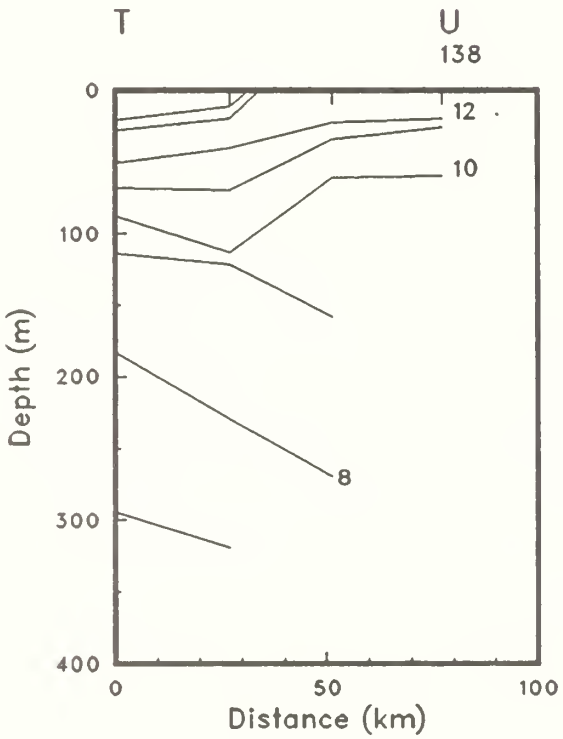


Figure 50(y).

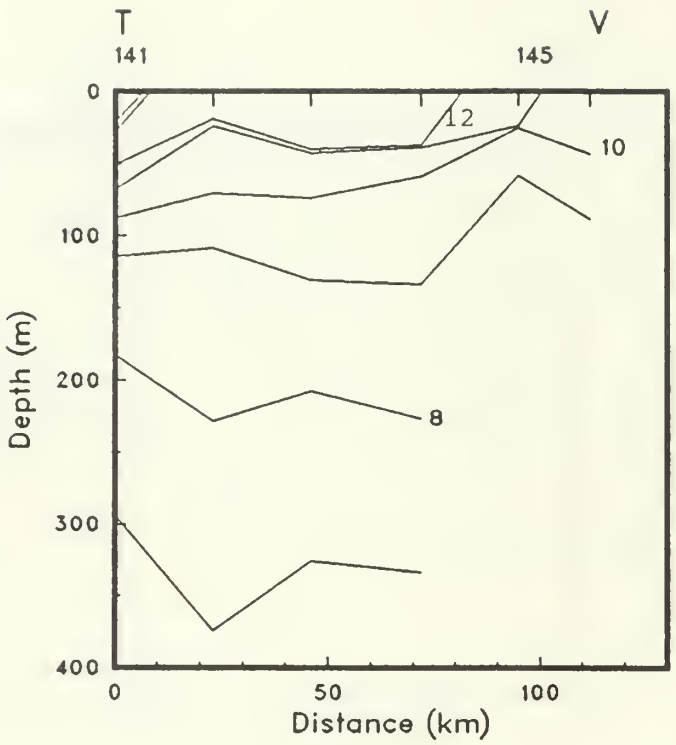


Figure 50(z).

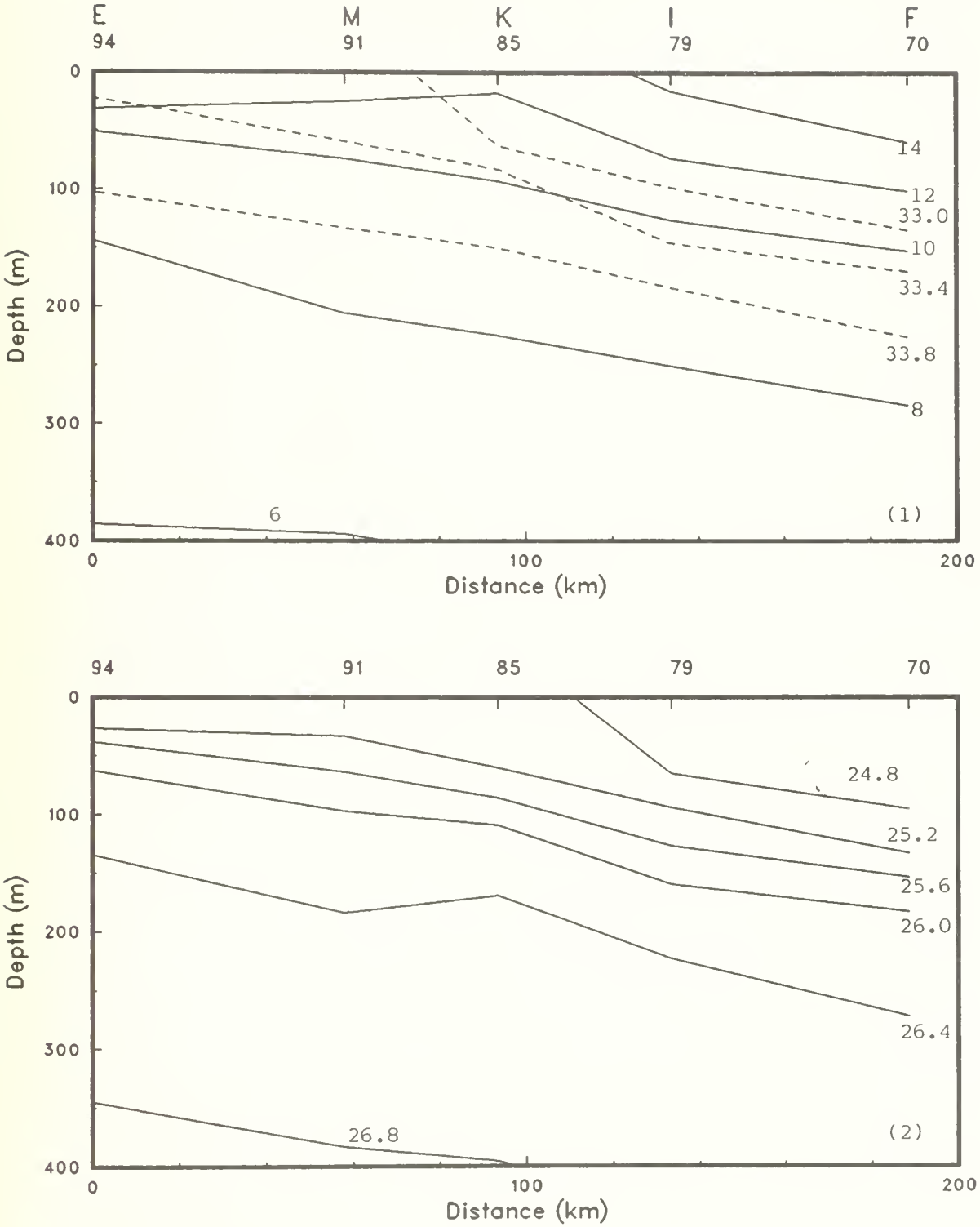


Figure 51(a): Isopleths of (1) temperature and salinity and (2) sigma-t from the CTD's. (OPTOMA11, Leg DII).

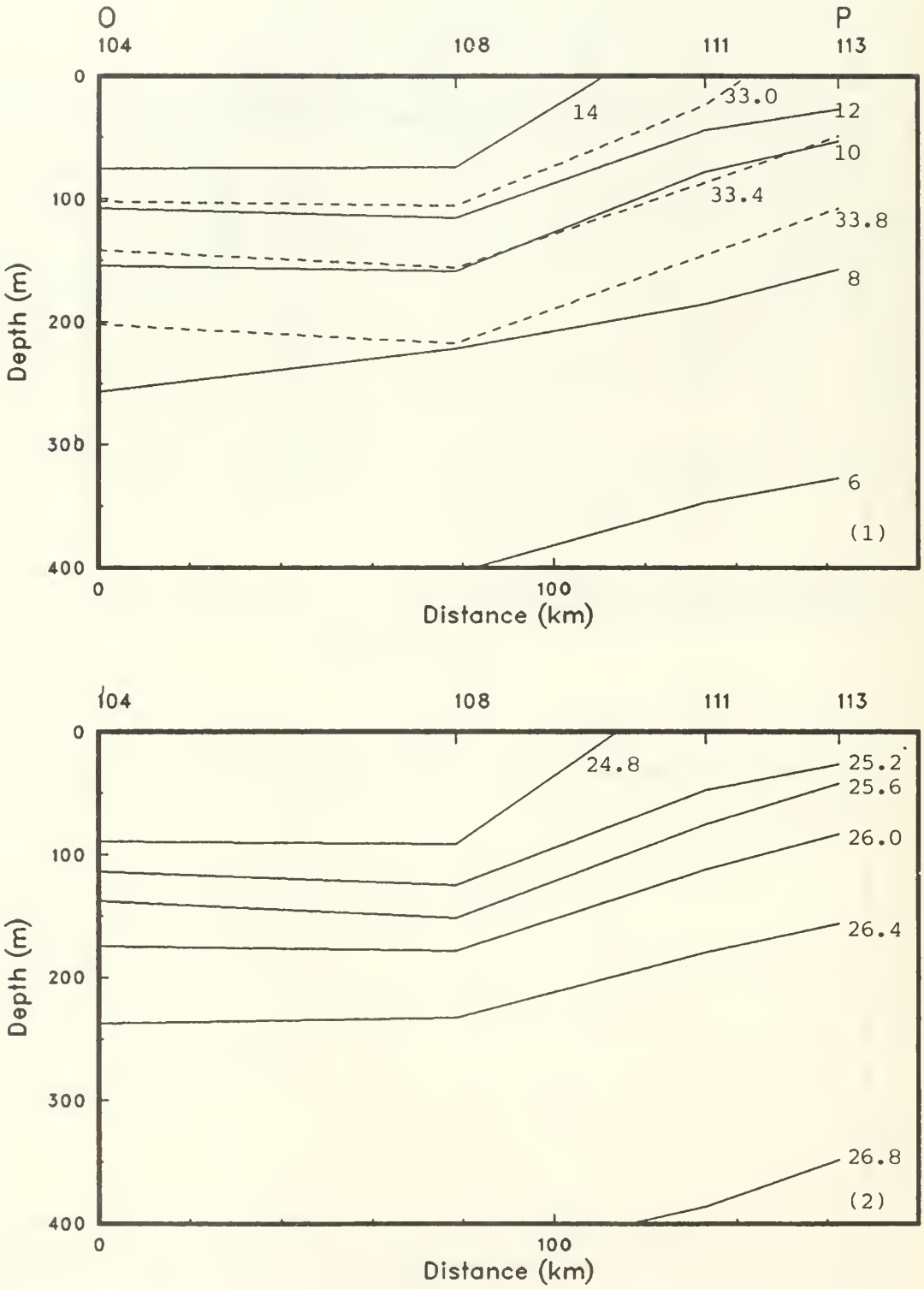

O
P
104
108
111
113
0
100
200
300
400
Depth (m)
14
33.0
12
10
33.4
33.8
8
6
(1)
0
100
Distance (km)
104
108
111
113
0
100
200
300
400
Depth (m)
24.8
25.2
25.6
26.0
26.4
26.8
(2)
0
100
Distance (km)

Figure 51(b).

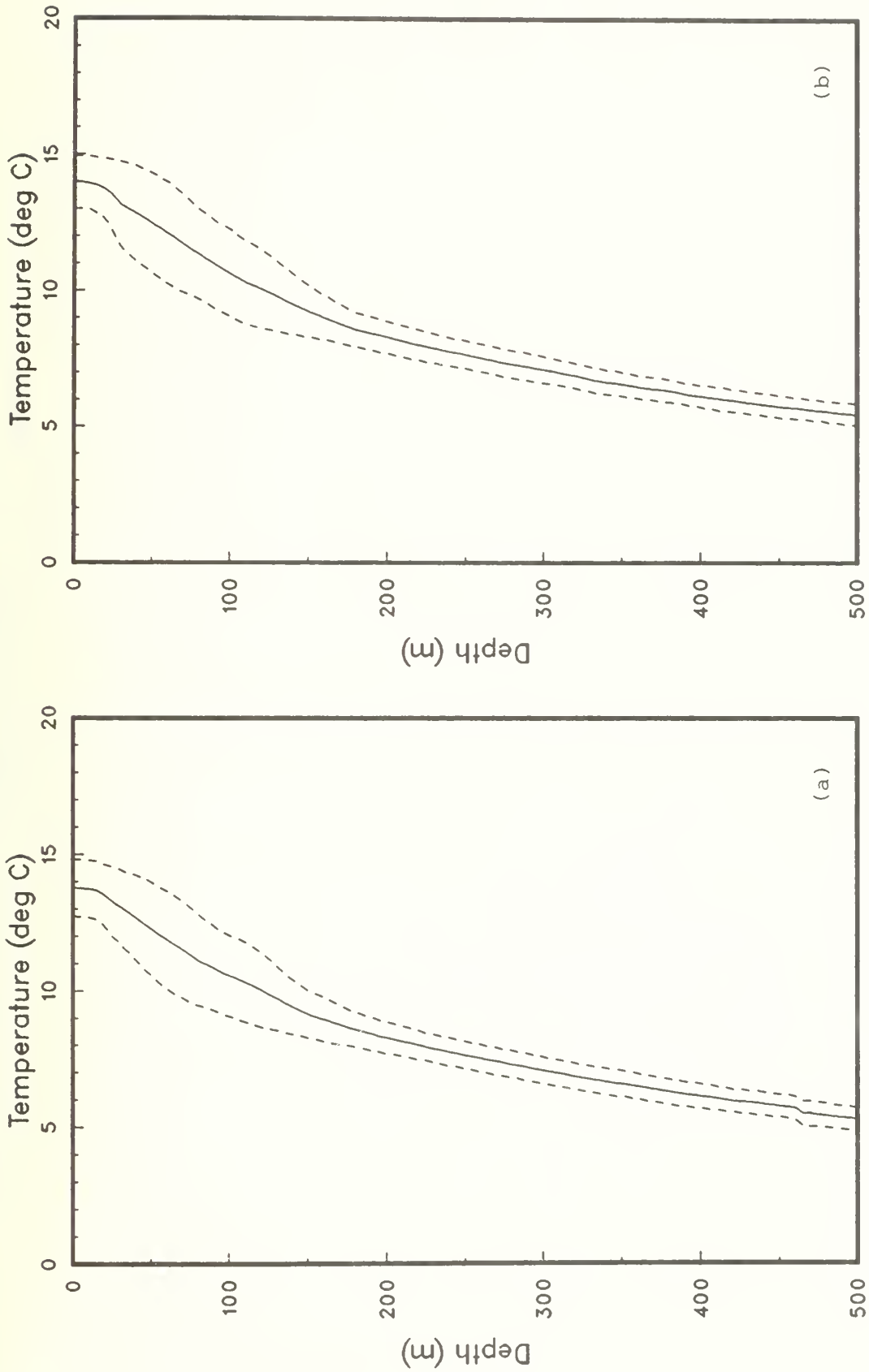


Figure 52: Mean temperature profiles from (a) XBT's and (b) CTD's, with + and - the standard deviation. (OPTOMA11, Leg DII).

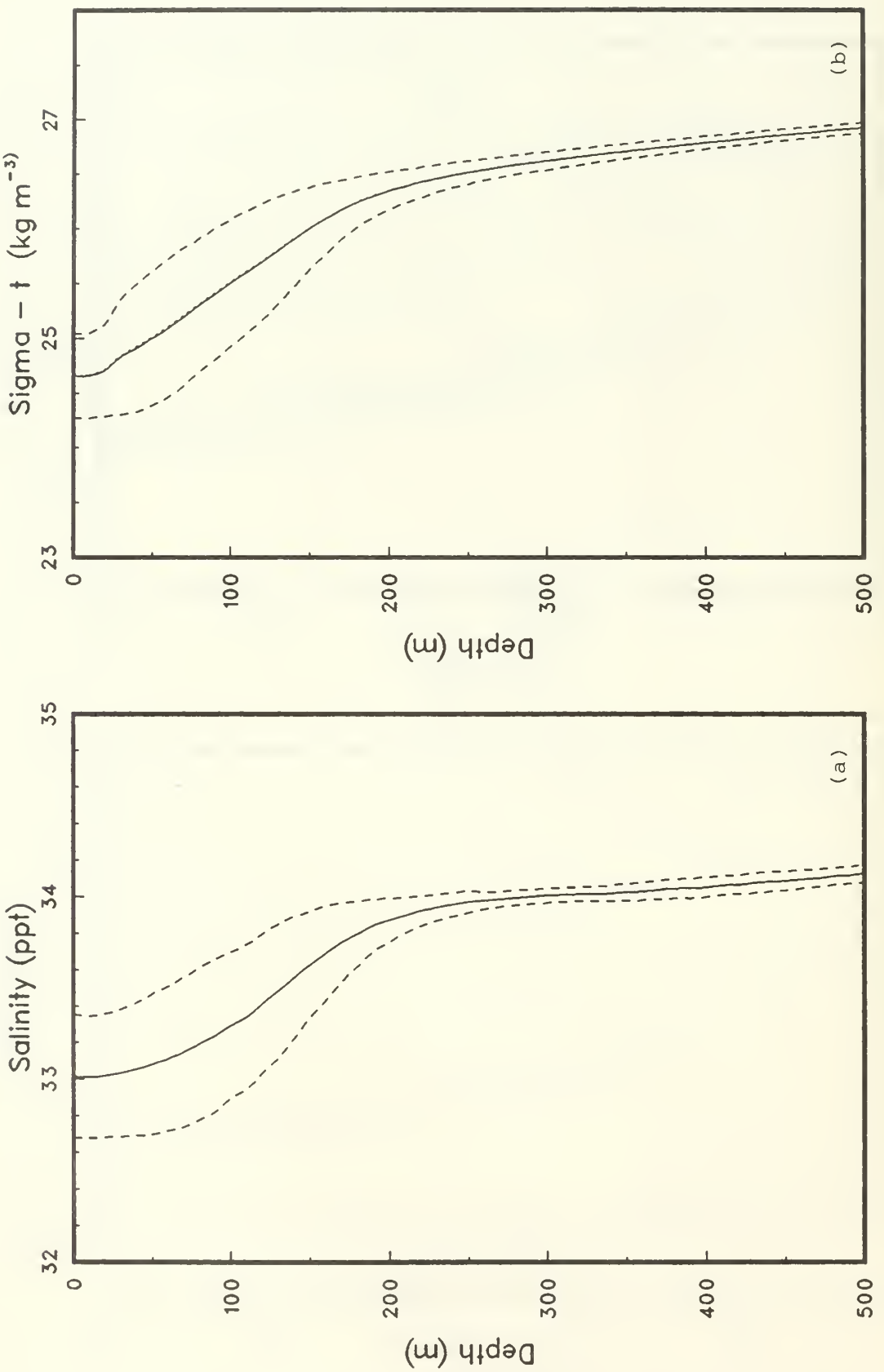


Figure 53: Mean profiles of (a) salintiy and (b) sigma-t, with + and - the standard deviations, from the CTD's. (OPTOMA11, Leg DII).

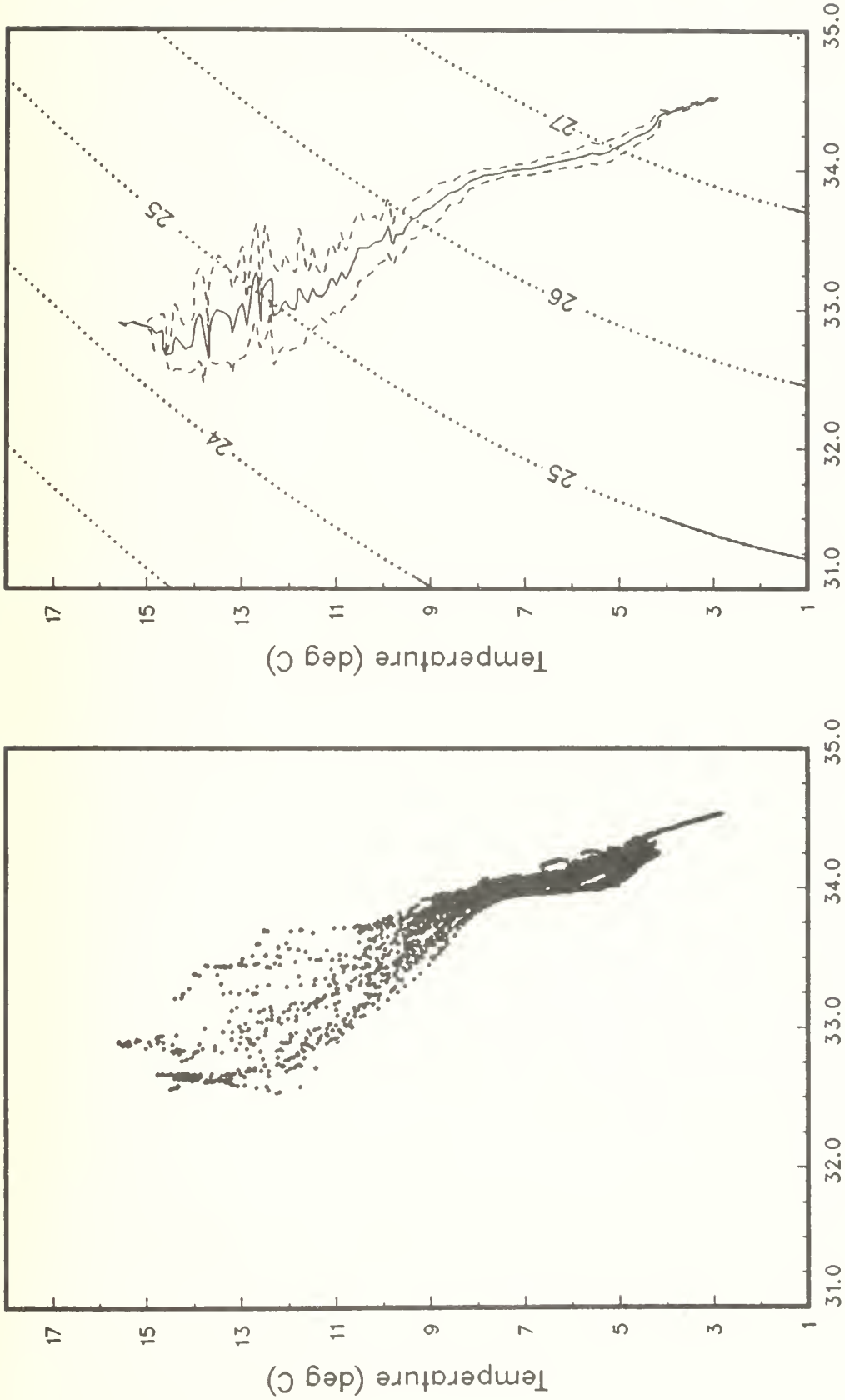


Figure 54: (a) T-S pairs and (b) mean T-S relation, with + and - the standard deviation, from the CTD's. Selected sigma-t contours are also shown. (OPTOMA11, Leg DII).

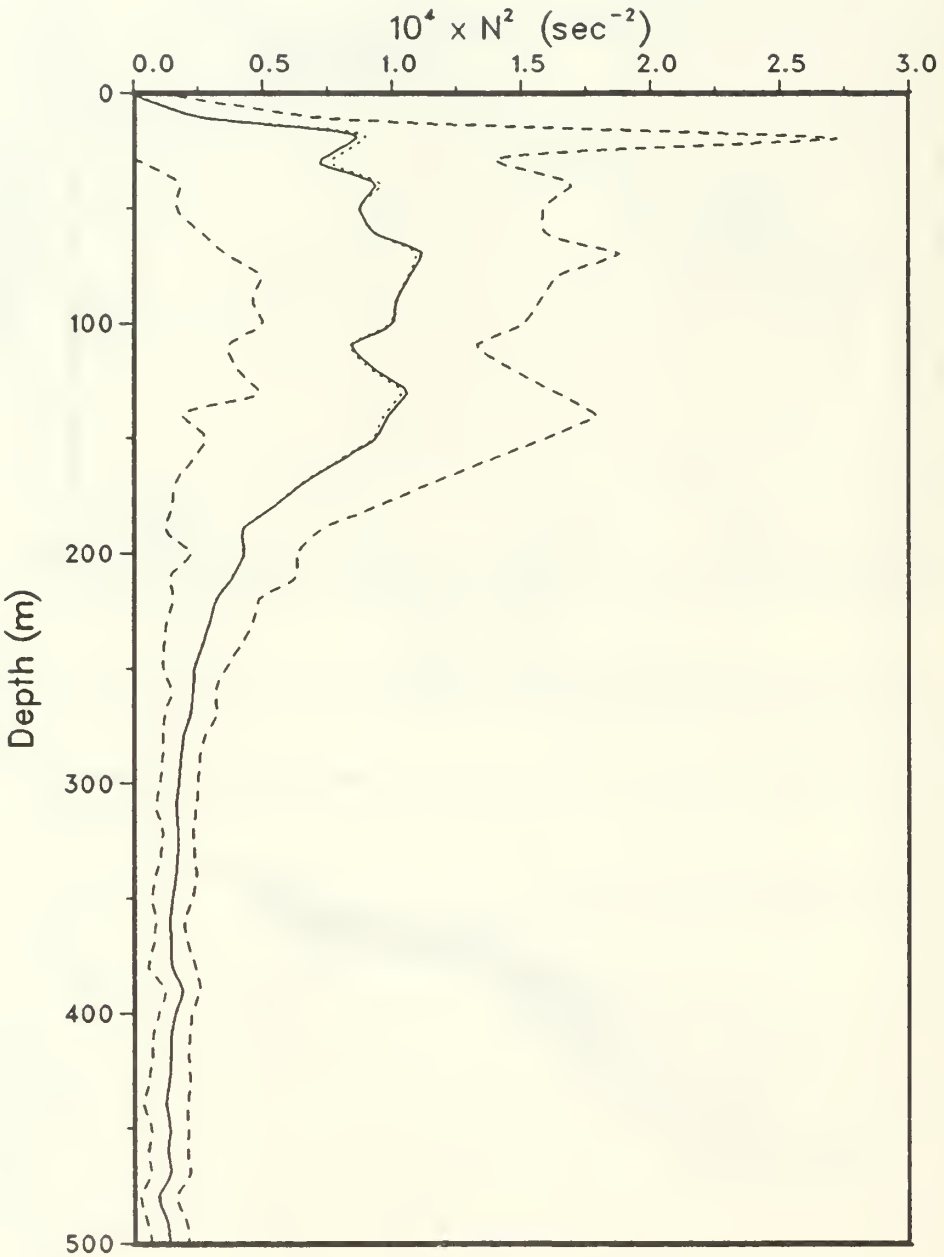


Figure 55: Mean N^2 profile (——), with + and - the standard deviation (----). The N^2 profile from $\overline{T(z)}$ and $\overline{S(z)}$ is also shown(••••). (OPTOMA11, Leg DII).

Section 6

OPTOMAll Leg DIII

27 July - 5 August, 1984

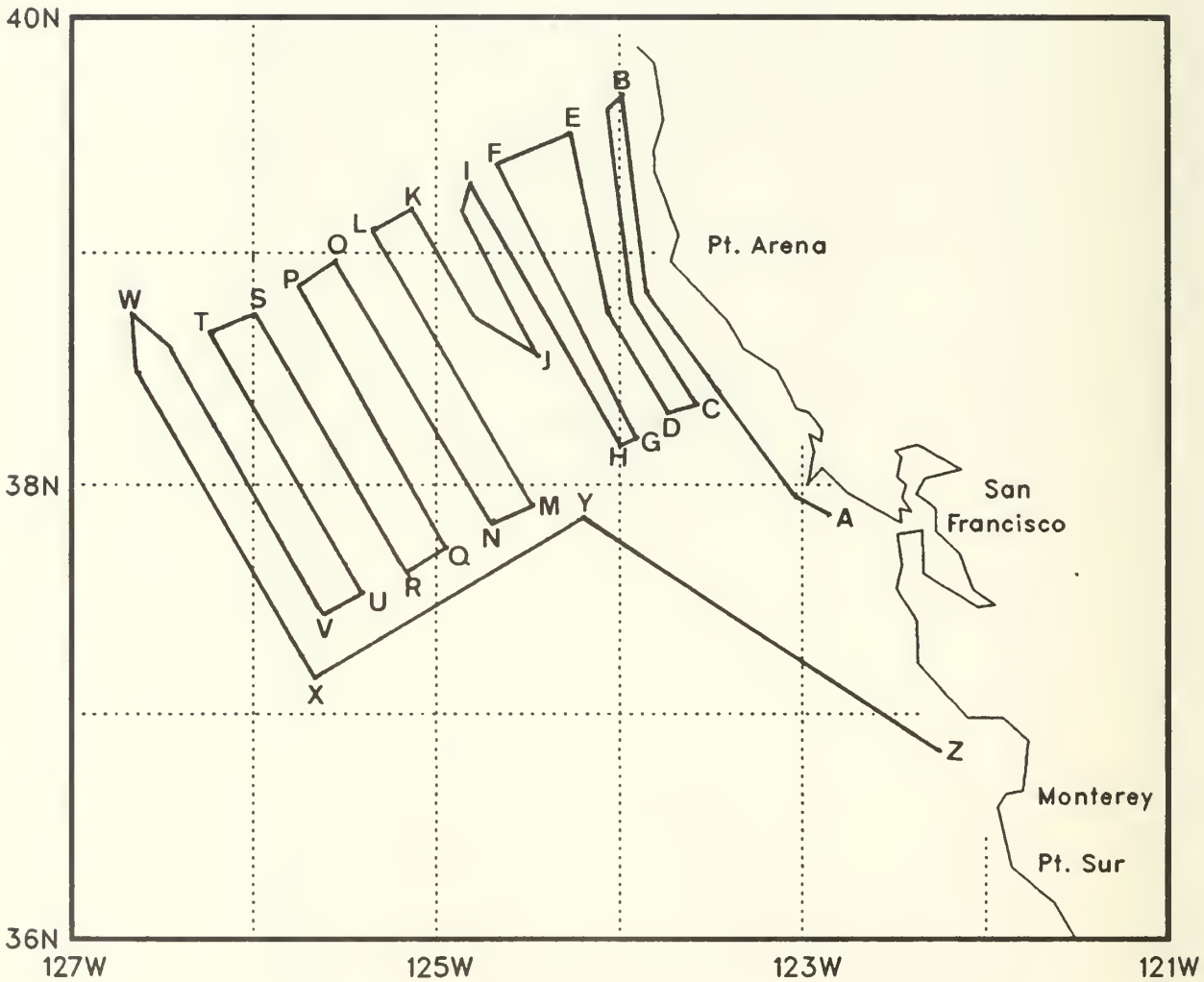


Figure 56: The cruise track for OPTOMA11, Leg DIII.

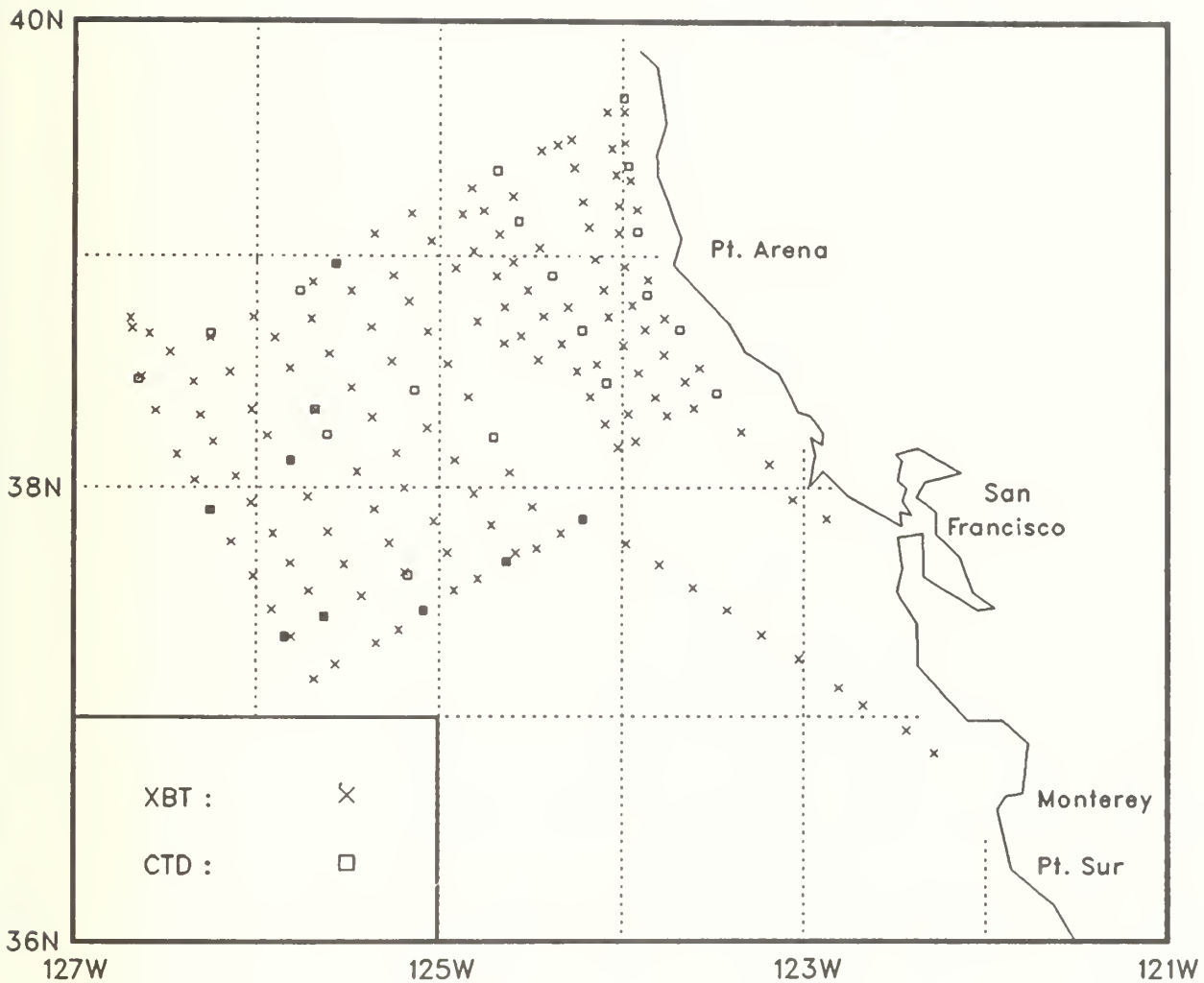


Figure 57: XBT and CTD locations for OPTOMA11, Leg DIII.

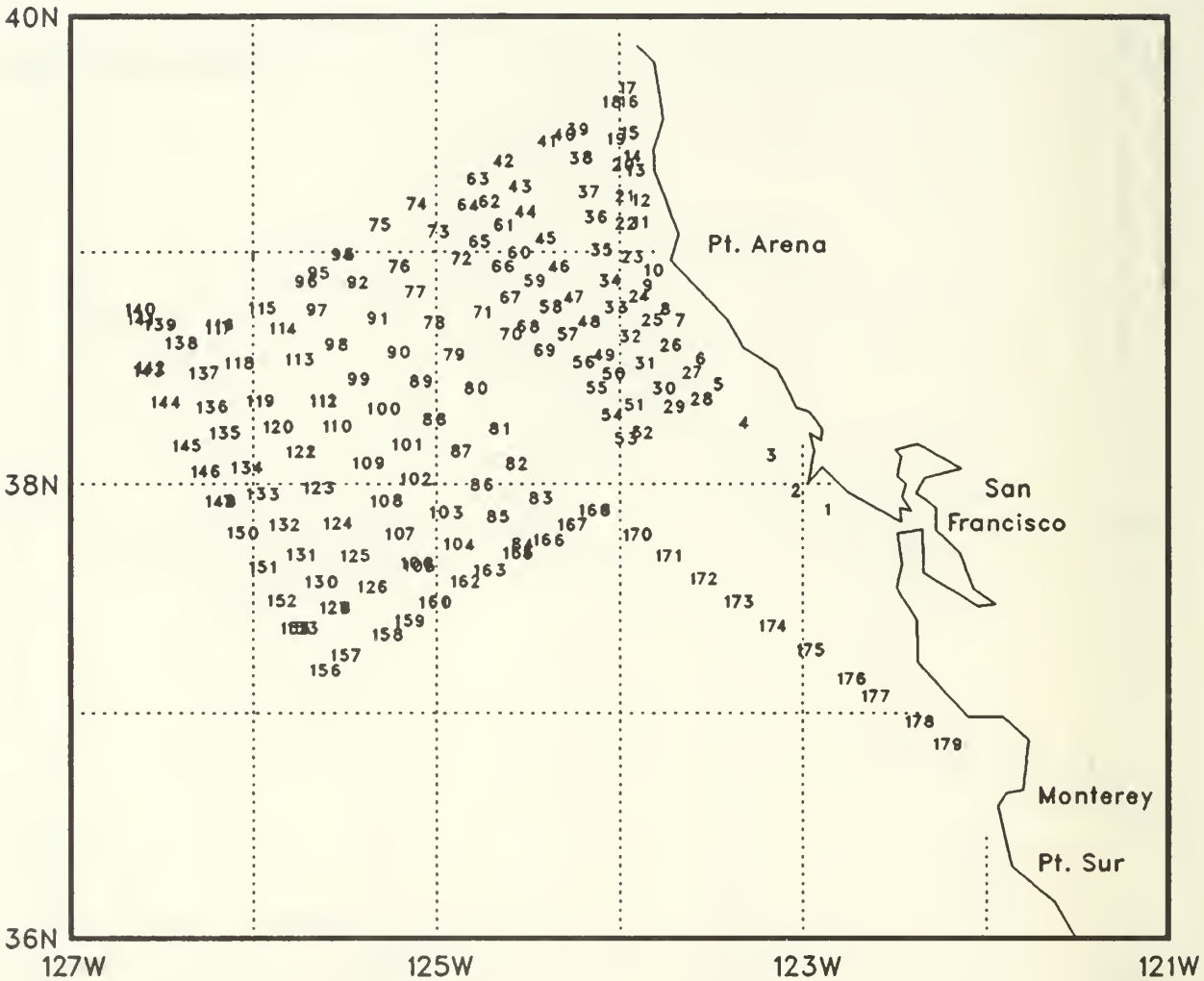


Figure 58: Station numbers for OPTOMA11, Leg DIII.

Table 7: Leg DIII Station Listing

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
1	XBT	84210	81	37.52	122.52	13.7			
2	XBT	84210	150	37.57	123.04	13.5			
3	XBT	84210	622	38.06	123.12	12.4			
4	XBT	84210	1031	38.15	123.21	11.8			
5	CTD	84210	1532	38.25	123.29	10.7	33.68	11.3	33.72
6	XBT	84210	1730	38.31	123.34	11.5			
7	CTD	84210	1927	38.41	123.41	12.6	33.49	13.1	33.53
8	XBT	84210	2136	38.44	123.46	12.3			
9	CTD	84210	2310	38.50	123.52	11.9	33.54	12.4	33.58
10	XBT	84211	44	38.54	123.51	12.6			
11	CTD	84211	138	39.06	123.55	12.3	33.55	12.7	33.60
12	XBT	84211	255	39.12	123.55	12.3			
13	XBT	84211	326	39.20	123.57	10.9			
14	CTD	84211	451	39.23	123.58	11.8	33.73	11.9	33.78
15	XBT	84211	615	39.29	123.59	12.4			
16	XBT	84211	717	39.37	123.59	12.1			
17	CTD	84211	750	39.41	123.59	11.5	33.68	11.9	33.66
18	XBT	84211	902	39.37	124.05	11.3			
19	XBT	84211	947	39.28	124.04	12.0			
20	XBT	84211	1030	39.21	124.02	10.9			
21	XBT	84211	1114	39.13	124.01	13.1			
22	XBT	84211	1200	39.06	124.01	13.4			
23	XBT	84211	1250	38.57	123.59	12.0			
24	XBT	84211	1342	38.47	123.57	12.5			
25	XBT	84211	1423	38.41	123.52	13.2			
26	XBT	84211	1510	38.35	123.46	12.6			
27	XBT	84211	1605	38.28	123.39	11.2			
28	XBT	84211	1644	38.21	123.36	10.8			
29	XBT	84211	1747	38.19	123.45	12.6			
30	XBT	84211	1828	38.24	123.49	12.4			
31	XBT	84211	1919	38.30	123.54	12.8			
32	XBT	84211	2013	38.37	124.00	14.1			
33	XBT	84211	2108	38.44	124.04	13.8			
34	XBT	84211	2152	38.51	124.06	12.5			
35	XBT	84211	2250	38.59	124.09	13.5			
36	XBT	84211	2324	39.08	124.11	14.2			
37	XBT	84212	30	39.14	124.13	12.1			
38	XBT	84212	126	39.23	124.16	11.7			
39	XBT	84212	217	39.30	124.17	11.2			
40	XBT	84212	238	39.29	124.21	11.1			
41	XBT	84212	256	39.27	124.26	11.7			
42	CTD	84212	430	39.22	124.41	12.8	32.71	13.0	32.71
43	XBT	84212	603	39.15	124.36	11.5			
44	CTD	84212	750	39.09	124.34	11.8	33.66	12.0	33.70
45	XBT	84212	903	39.02	124.27	14.1			

STN	TYPE	YR/DAY	GMT	LAT (NORTH) DD.MM	LONG (WEST) DDD.MM	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
46	CTD	84212	950	38.55	124.23	13.2	33.48	13.4	33.45
47	XBT	84212	1144	38.47	124.18	13.7			
48	CTD	84212	1240	38.41	124.13	13.5	33.50	13.6	33.53
49	XBT	84212	1396	38.32	124.08	13.1			
50	CTD	84212	1502	38.27	124.05	13.3	33.48	13.3	33.50
51	XBT	84212	1642	38.19	123.58	13.8			
52	XBT	84212	1814	38.12	123.55	13.7			
53	XBT	84212	1858	38.10	124.01	14.2			
54	XBT	84212	1942	38.17	124.06	14.0			
55	XBT	84212	2036	38.24	124.11	13.9			
56	XBT	84212	2127	38.30	124.15	14.0			
57	XBT	84212	2221	38.38	124.20	14.2			
58	XBT	84212	2317	38.45	124.26	14.3			
59	XBT	84213	14	38.51	124.31	13.1			
60	XBT	84213	106	38.59	124.36	14.0			
61	XBT	84213	203	39.06	124.40	12.2			
62	XBT	84213	256	39.12	124.45	11.4			
63	XBT	84213	403	39.18	124.49	12.3			
64	XBT	84213	542	39.11	124.53	11.3			
65	XBT	84213	638	39.01	124.49	12.7			
66	XBT	84213	718	38.55	124.41	13.5			
67	XBT	84213	839	38.47	124.39	13.8			
68	XBT	84213	930	38.40	124.33	14.0			
69	XBT	84213	1011	38.33	124.27	14.1			
70	XBT	84213	1219	38.38	124.39	14.3			
71	XBT	84213	1432	38.43	124.48	14.1			
72	XBT	84213	1755	38.57	124.55	12.9			
73	XBT	84213	1933	39.04	125.02	12.6			
74	XBT	84213	2111	39.11	125.09	12.5			
75	XBT	84213	2238	39.06	125.21	12.8			
76	XBT	84213	2336	38.55	125.15	14.2			
77	XBT	84214	23	38.48	125.10	13.8			
78	XBT	84214	115	38.40	125.04	14.2			
79	XBT	84214	211	38.32	124.57	14.1			
80	XBT	84214	314	38.24	124.50	14.2			
81	CTD	84214	431	38.13	124.42	14.2	33.29	14.2	*
82	XBT	84214	600	38.04	124.37	14.0			
83	XBT	84214	655	37.55	124.29	14.6			
84	XBT	84214	830	37.43	124.35	14.8			
85	XBT	84214	1243	37.50	124.43	14.5			
86	XBT	84214	1514	37.59	124.49	14.5			
87	XBT	84214	1755	38.07	124.55	14.6			
88	XBT	84214	1942	38.15	125.04	14.6			
89	CTD	84214	2211	38.25	125.08	14.5	33.34	15.0	33.44
90	XBT	84215	0	38.33	125.16	14.7			

* Data not available

STN	TYPE	YR/DAY	GMT	LAT (NORTH) DD.MM	LONG (WEST) DDD.MM	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
91	XBT	84215	109	38.42	125.22	14.5			
92	XBT	84215	218	38.51	125.29	13.2			
93	CTD	84215	330	38.58	125.34	14.4	32.60	14.6	32.68
94	XBT	84215	335	38.58	125.34	14.7			
95	XBT	84215	527	38.53	125.41	15.1			
96	CTD	84215	602	38.51	125.46	15.6	32.46	15.4	32.52
97	XBT	84215	705	38.44	125.42	14.5			
98	XBT	84215	756	38.35	125.36	14.5			
99	XBT	84215	853	38.26	125.29	14.4			
100	XBT	84215	944	38.18	125.22	14.0			
101	XBT	84215	1046	38.09	125.14	14.4			
102	XBT	84215	1118	38.00	125.11	15.1			
103	XBT	84215	1243	37.51	125.02	14.4			
104	XBT	84215	1336	37.43	124.57	14.2			
105	CTD	84215	1500	37.37	125.10	14.2	32.84	14.4	32.93
106	XBT	84215	1519	37.38	125.11	14.4			
107	XBT	84215	1747	37.46	125.16	14.6			
108	XBT	84215	1855	37.54	125.21	14.4			
109	XBT	84215	2003	38.04	125.27	14.6			
110	CTD	84215	2130	38.14	125.37	14.5	33.45	15.0	33.49
111	XBT	84216	100	38.20	125.41	14.8			
112	CTD	84216	105	38.20	125.41	14.7	33.41	15.0	33.44
113	XBT	84216	322	38.31	125.49	14.8			
114	XBT	84216	430	38.39	125.54	15.4			
115	XBT	84216	553	38.44	126.01	15.7			
116	CTD	84216	700	38.40	126.15	15.6	32.44	15.7	32.49
117	XBT	84216	725	38.39	126.15	15.7			
118	XBT	84216	910	38.30	126.09	15.8			
119	XBT	84216	1013	38.20	126.02	15.7			
120	XBT	84216	1055	38.14	125.56	14.9			
121	CTD	84216	1244	38.07	125.49	14.6	33.45	14.7	33.49
122	XBT	84216	1200	38.07	125.49	14.9			
123	XBT	84216	1339	37.58	125.43	14.8			
124	XBT	84216	1435	37.49	125.37	14.6			
125	XBT	84216	1530	37.40	125.31	15.0			
126	XBT	84216	1619	37.32	125.25	14.3			
127	XBT	84216	1730	37.26	125.38	15.1			
128	CTD	84216	1735	37.26	125.38	15.0	33.01	15.5	33.04
129	XBT	84216	1810	37.26	125.38	15.4			
130	XBT	84216	1900	37.33	125.43	15.2			
131	XBT	84216	1955	37.40	125.49	14.5			
132	XBT	84216	2102	37.48	125.54	13.4			
133	XBT	84216	2203	37.56	126.02	14.7			
134	XBT	84216	2255	38.03	126.07	13.4			
135	XBT	84217	5	38.12	126.14	16.2			

STN	TYPE	YR/DAY	GMT	LAT (NORTH) DD.MM	LONG (WEST) DDD.MM	SURFACE TEMP (DEG C)	SURFACE SALINITY (PPT)	BUCKET TEMP (DEG C)	BOTTLE SALINITY (PPT)
136	XBT	84217	51	38.19	126.18	15.6			
137	XBT	84217	147	38.28	126.21	16.1			
138	XBT	84217	247	38.35	126.28	15.7			
139	XBT	84217	331	38.40	126.35	16.0			
140	XBT	84217	417	38.44	126.41	16.3			
141	XBT	84217	431	38.41	126.41	16.2			
142	XBT	84217	605	38.29	126.38	16.4			
143	CTD	84217	625	38.28	126.39	16.0	32.48	16.1	32.52
144	XBT	84217	843	38.20	126.33	15.6			
145	XBT	84217	950	38.09	126.26	15.6			
146	XBT	84217	1034	38.02	126.20	15.8			
147	XBT	84217	1139	37.54	126.15	14.7			
148	XBT	84217	1147	37.54	126.15	14.4			
149	CTD	84217	1405	37.54	126.15	14.8	32.54	15.0	32.63
150	XBT	84217	1452	37.46	126.08	13.4			
151	XBT	84217	1552	37.37	126.01	14.8			
152	XBT	84217	1658	37.28	125.55	15.3			
153	XBT	84217	1730	37.21	125.49	15.3			
154	CTD	84217	1735	37.21	125.51	15.3	33.18	15.5	33.22
155	XBT	84217	1800	37.21	125.51	15.2			
156	XBT	84217	2102	37.10	125.41	15.5			
157	XBT	84217	2141	37.14	125.34	15.0			
158	XBT	84217	2255	37.19	125.21	15.3			
159	XBT	84217	2349	37.23	125.13	14.8			
160	XBT	84218	40	37.28	125.05	14.9			
161	CTD	84218	45	37.28	125.05	14.5	32.71	14.7	*
162	XBT	84218	219	37.33	124.55	15.0			
163	XBT	84218	303	37.36	124.47	14.2			
164	XBT	84218	409	37.41	124.38	15.0			
165	CTD	84218	418	37.41	124.38	14.6	33.31	14.7	*
166	XBT	84218	531	37.44	124.28	14.5			
167	XBT	84218	625	37.48	124.20	14.4			
168	CTD	84218	738	37.52	124.13	14.5	33.50	14.7	*
169	XBT	84218	746	37.52	124.13	14.9			
170	XBT	84218	910	37.46	123.59	14.2			
171	XBT	84218	1002	37.40	123.48	13.6			
172	XBT	84218	1102	37.34	123.37	12.6			
173	XBT	84218	1203	37.28	123.25	13.3			
174	XBT	84218	1302	37.21	123.14	13.8			
175	XBT	84218	1406	37.15	123.02	14.5			
176	XBT	84218	1518	37.08	122.48	15.3			
177	XBT	84218	1602	37.03	122.40	14.9			
178	XBT	84218	1716	36.56	122.26	13.7			
179	XBT	84218	1808	36.50	122.17	13.2			

* Data not available

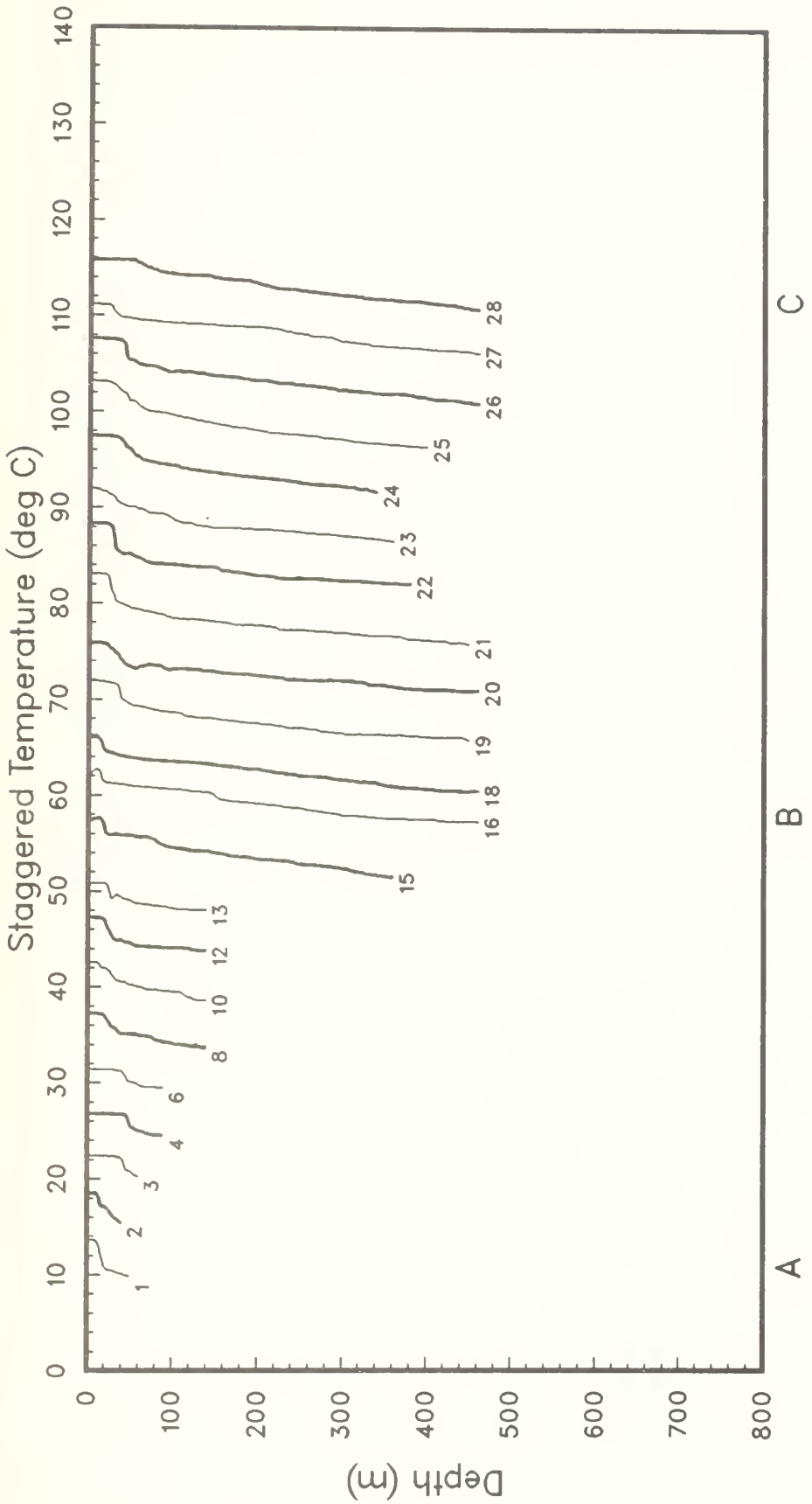


Figure 59(a): XBT temperature profiles, staggered by multiples of 5C. (OPTOMA11, Leg DIII).

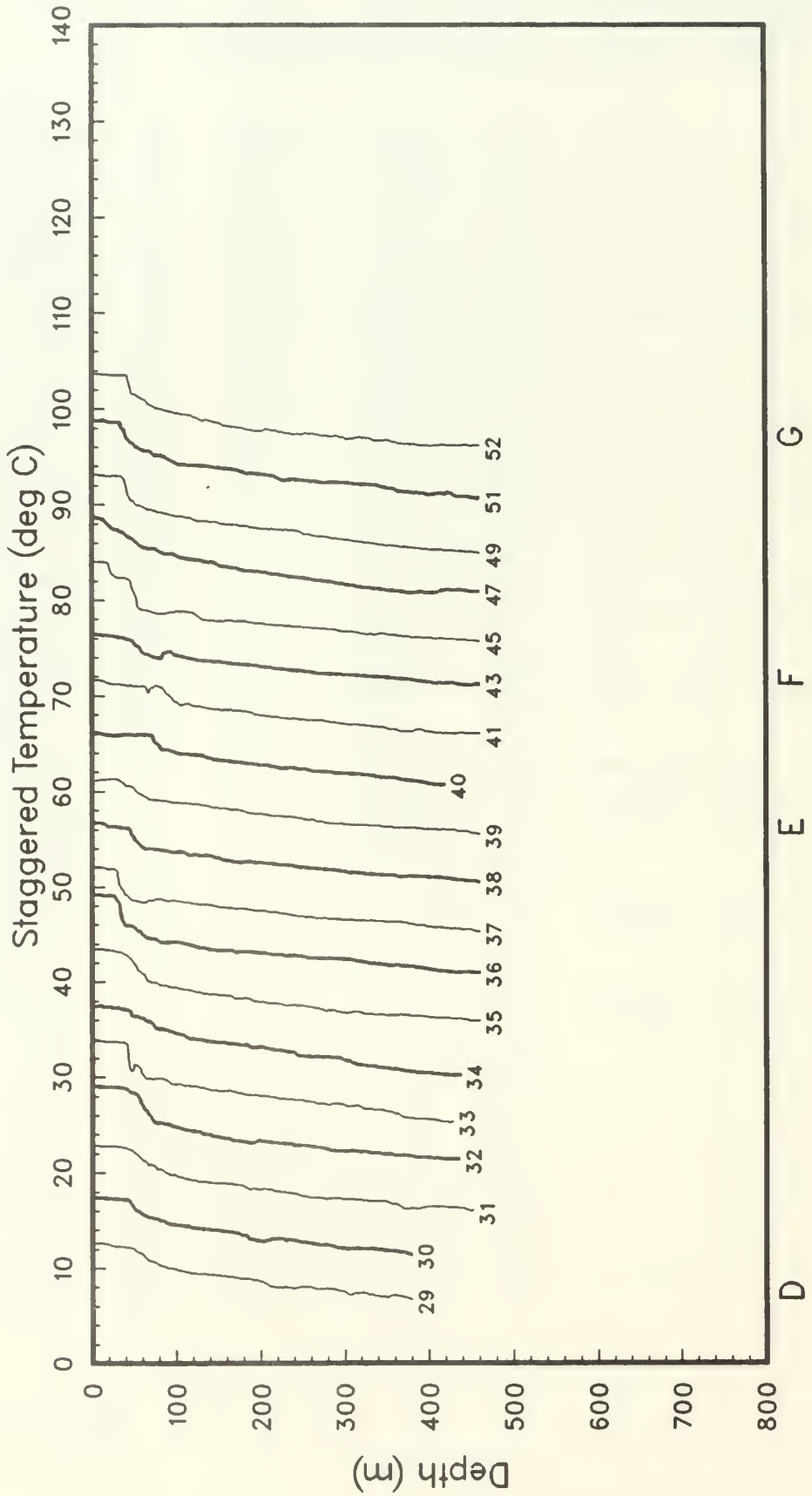

Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
Depth (m)
0
100
200
300
400
500
600
700
800
29
30
31
32
33
34
35
36
37
38
39
40
41
43
45
47
49
51
52
D
E
F
G

Figure 59(b).

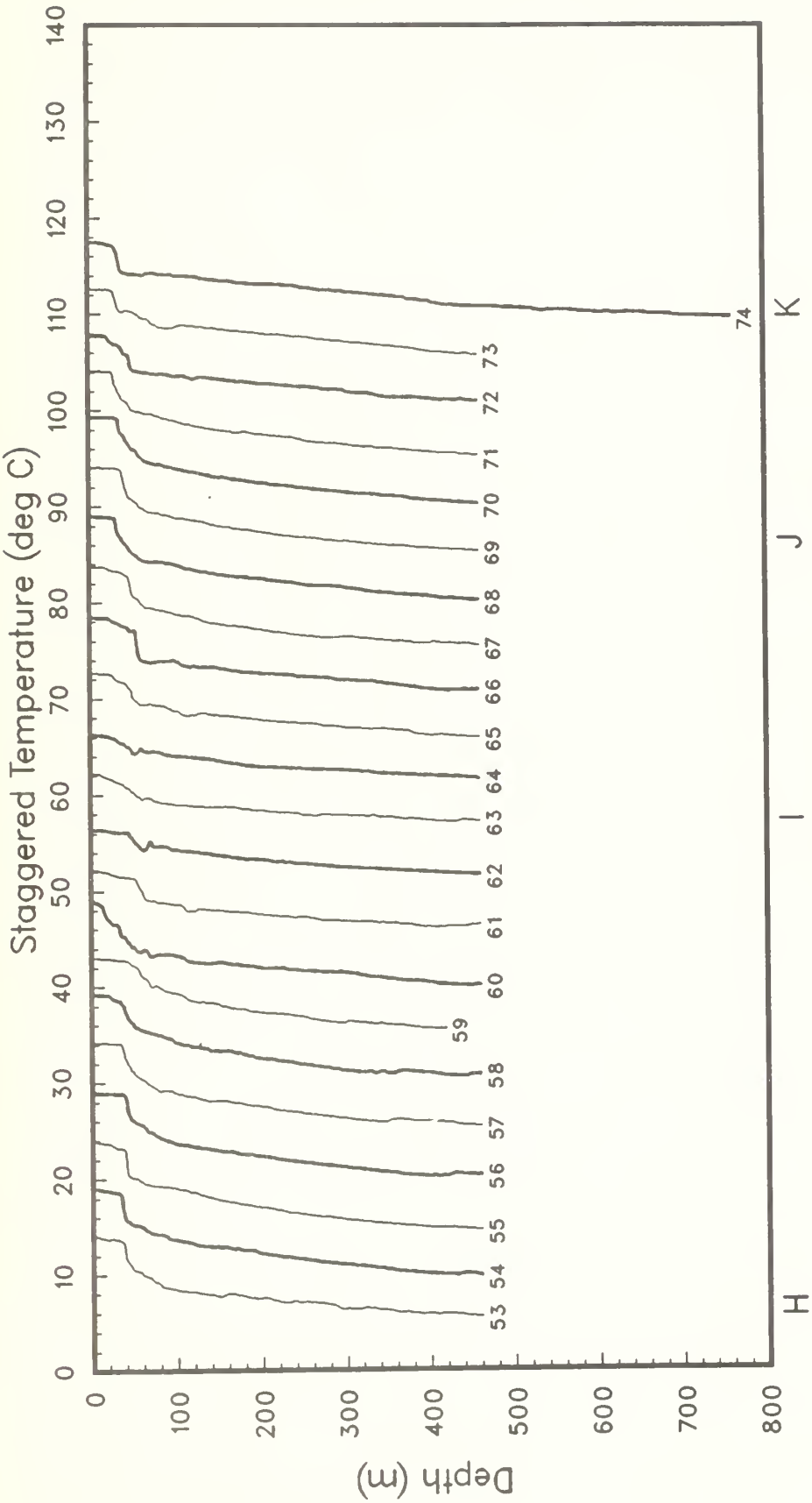

Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
Depth (m)
0
100
200
300
400
500
600
700
800
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
H
I
J
K

Figure 59(c).

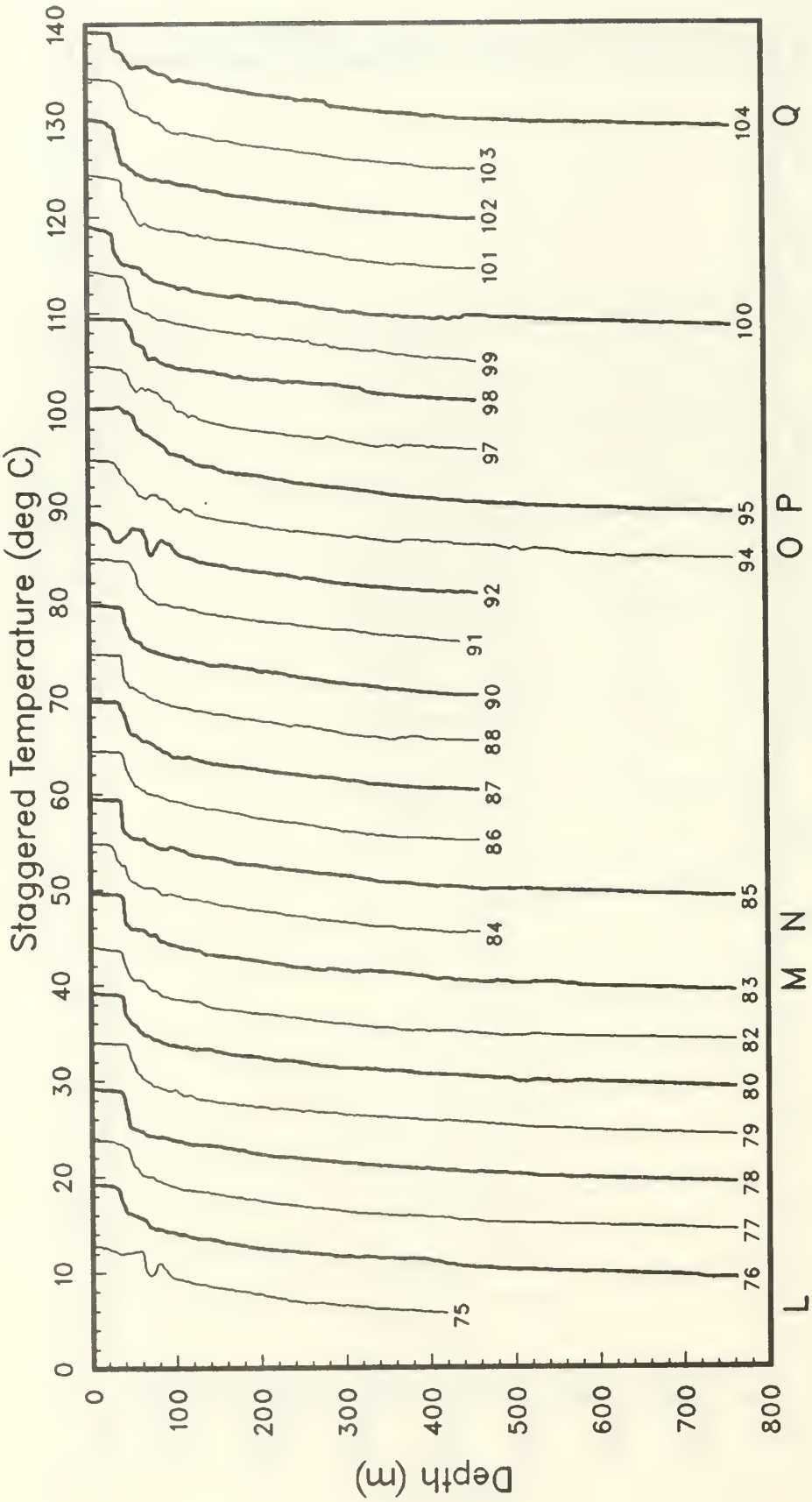

Staggered Temperature (deg C)
Depth (m)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
0
100
200
300
400
500
600
700
800
75
76
77
78
79
80
82
83
84
85
86
87
88
90
91
92
94
95
97
98
99
100
101
102
103
104
L
M
N
O
P
Q

Figure 59(d).

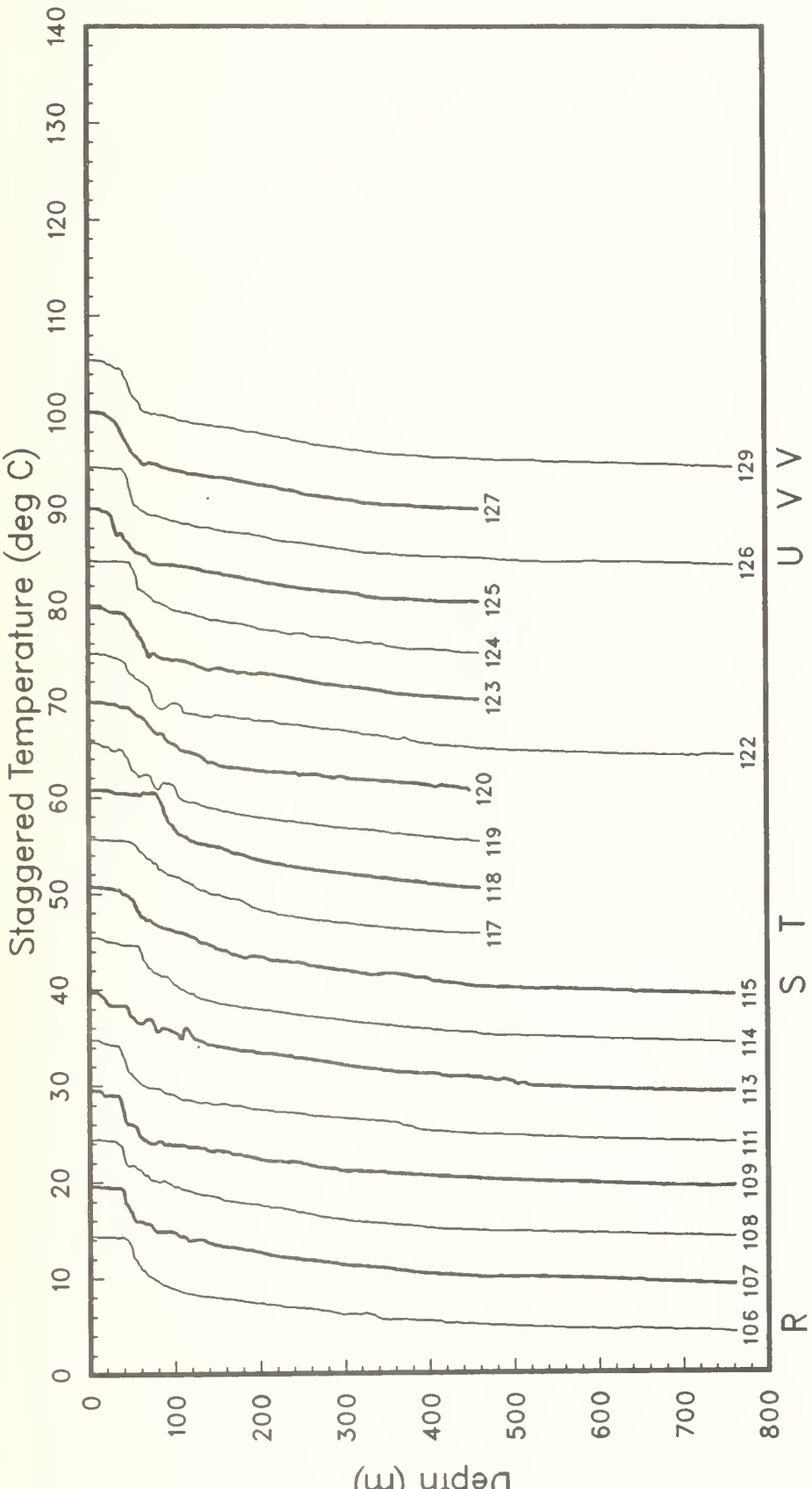

Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
Depth (m)
0
100
200
300
400
500
600
700
800
106 107 108 109 111 113 114 115
117 118 119 120
122
123 124 125
126
127
129
R
S T
U V V

Figure 59(e).

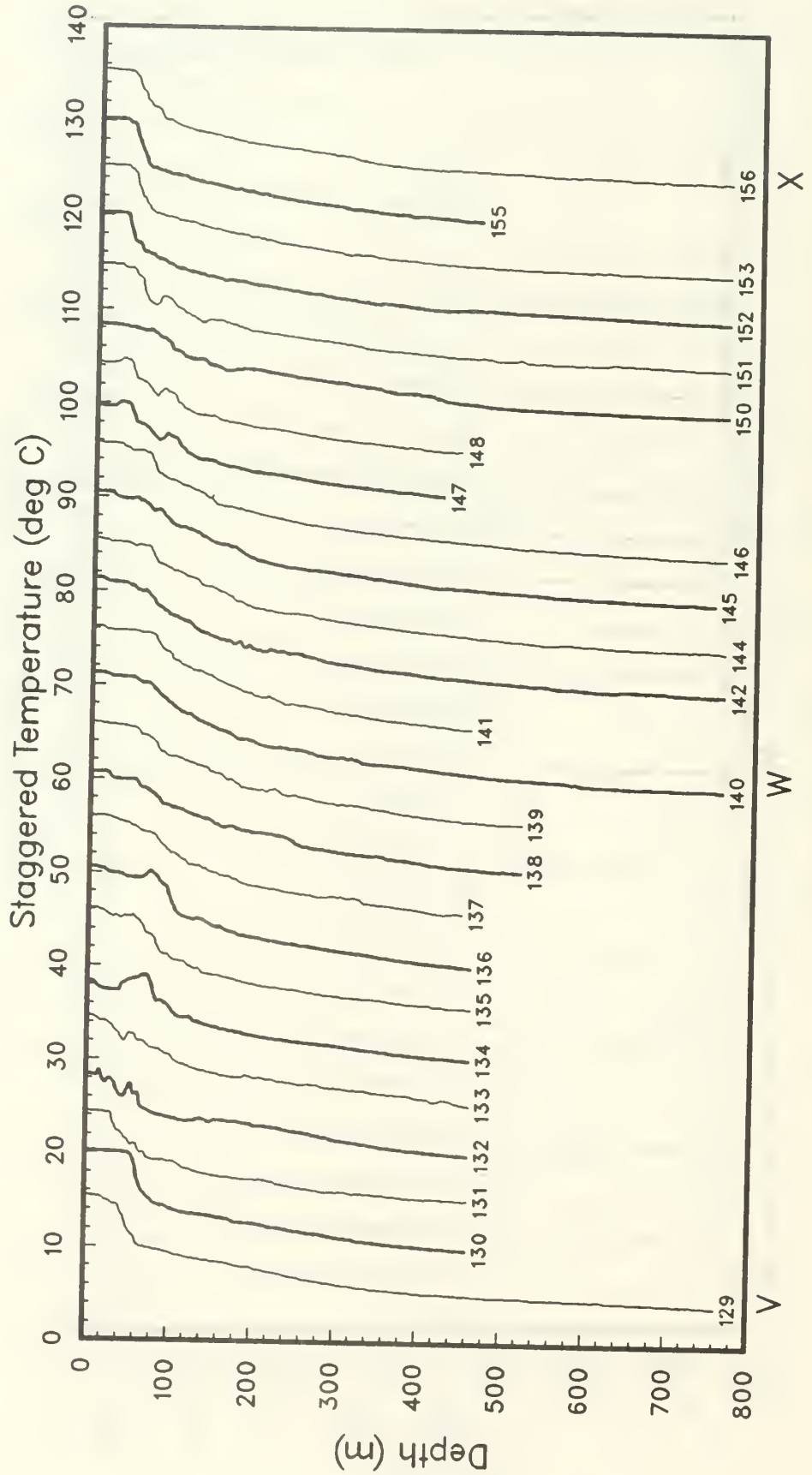

Staggered Temperature (deg C)
Depth (m)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
0
100
200
300
400
500
600
700
800
129
130
131
132
133
134
135
136
137
138
139
140
141
142
144
145
146
147
148
150
151
152
153
155
156
V
W
X

Figure 59(f).

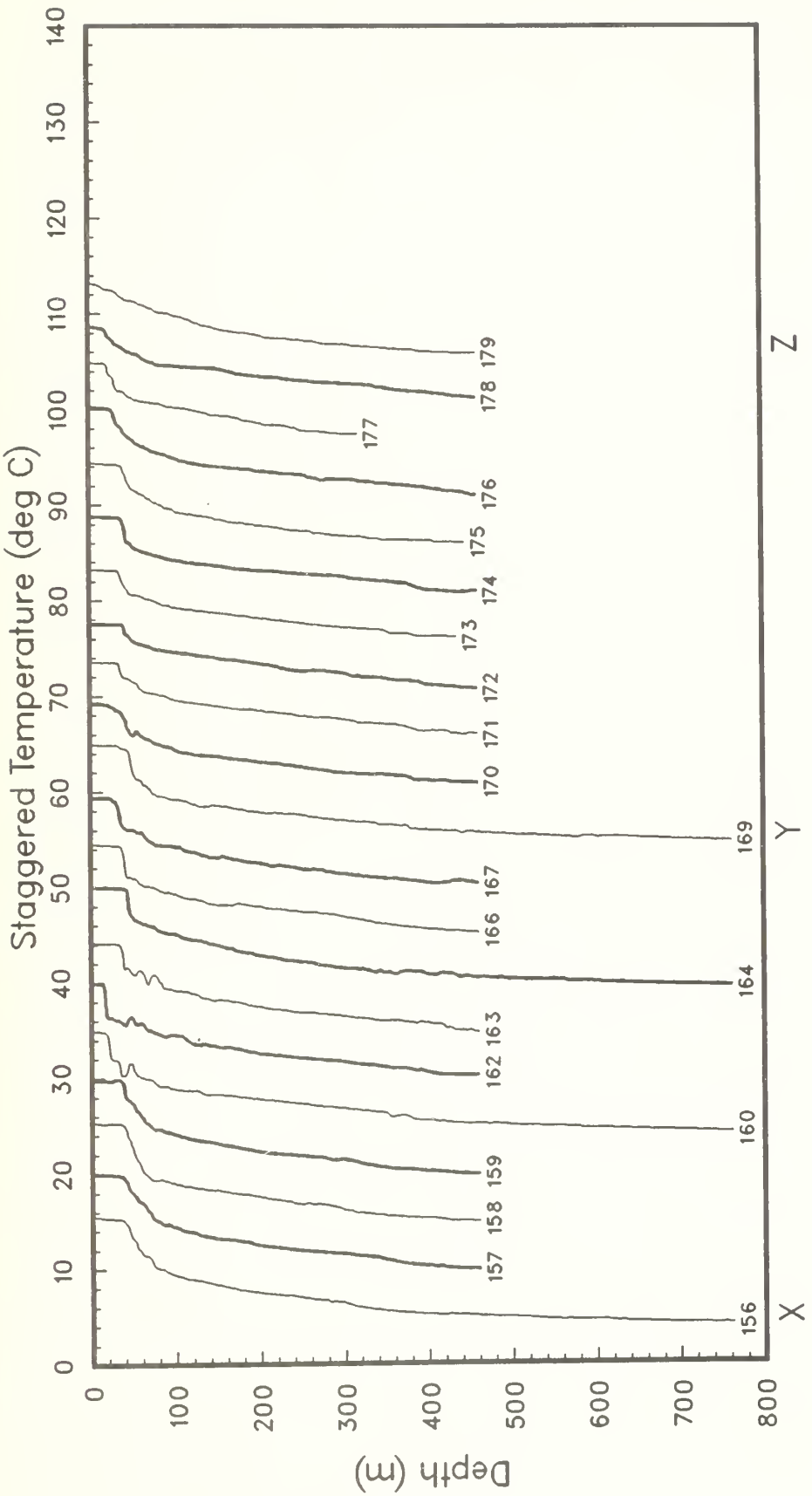

Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
Depth (m)
0
100
200
300
400
500
600
700
800
156
157
158
159
160
162
163
164
166
167
169
170
171
172
173
174
175
176
177
178
179
X
Y
Z

Figure 59(g).

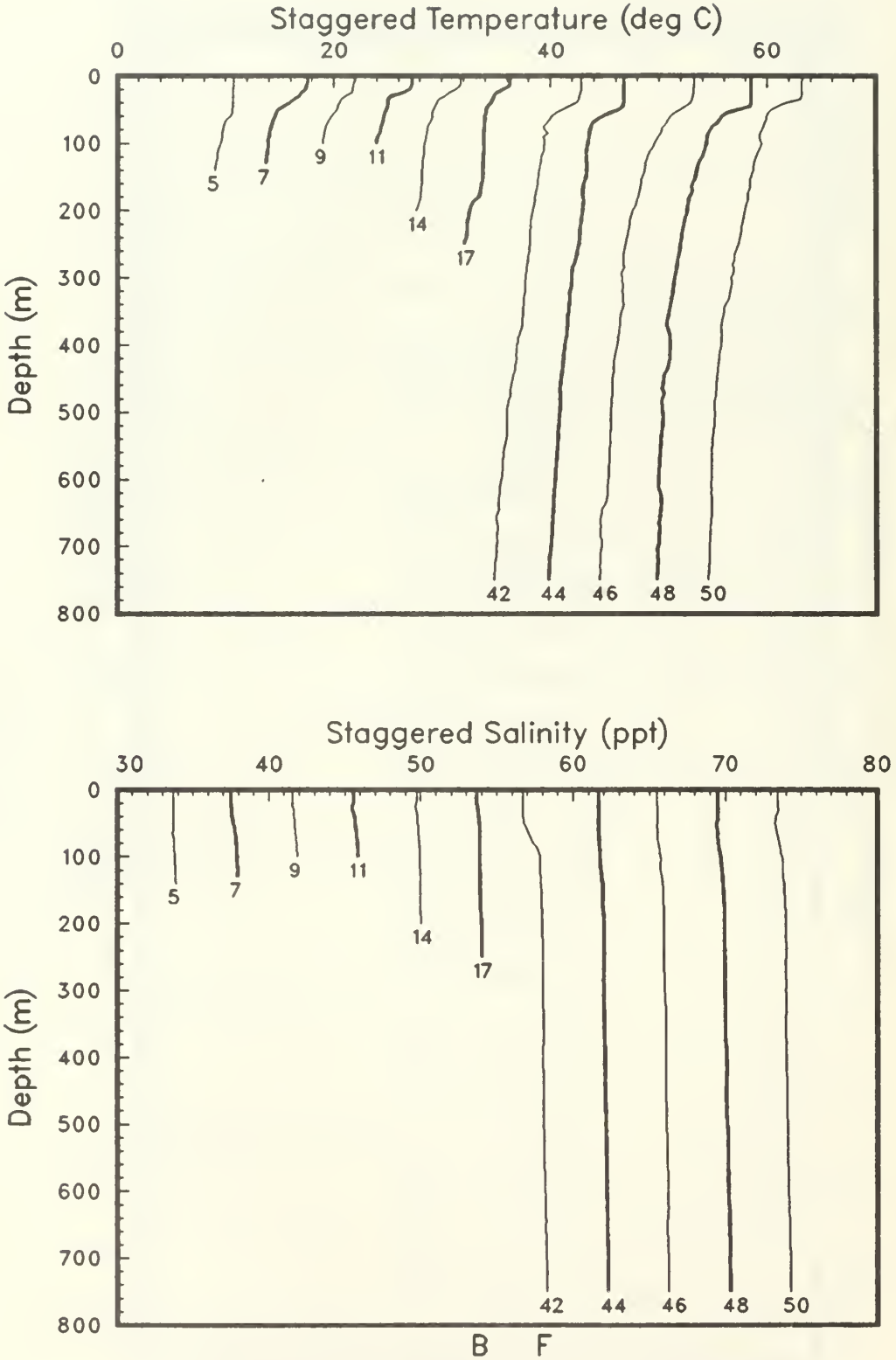


Figure 60(a): CTD temperature profiles, staggered by multiples of 5C, and salinity profiles, staggered by multiples of 4 ppt. (OPTOMA11, Leg DIII).

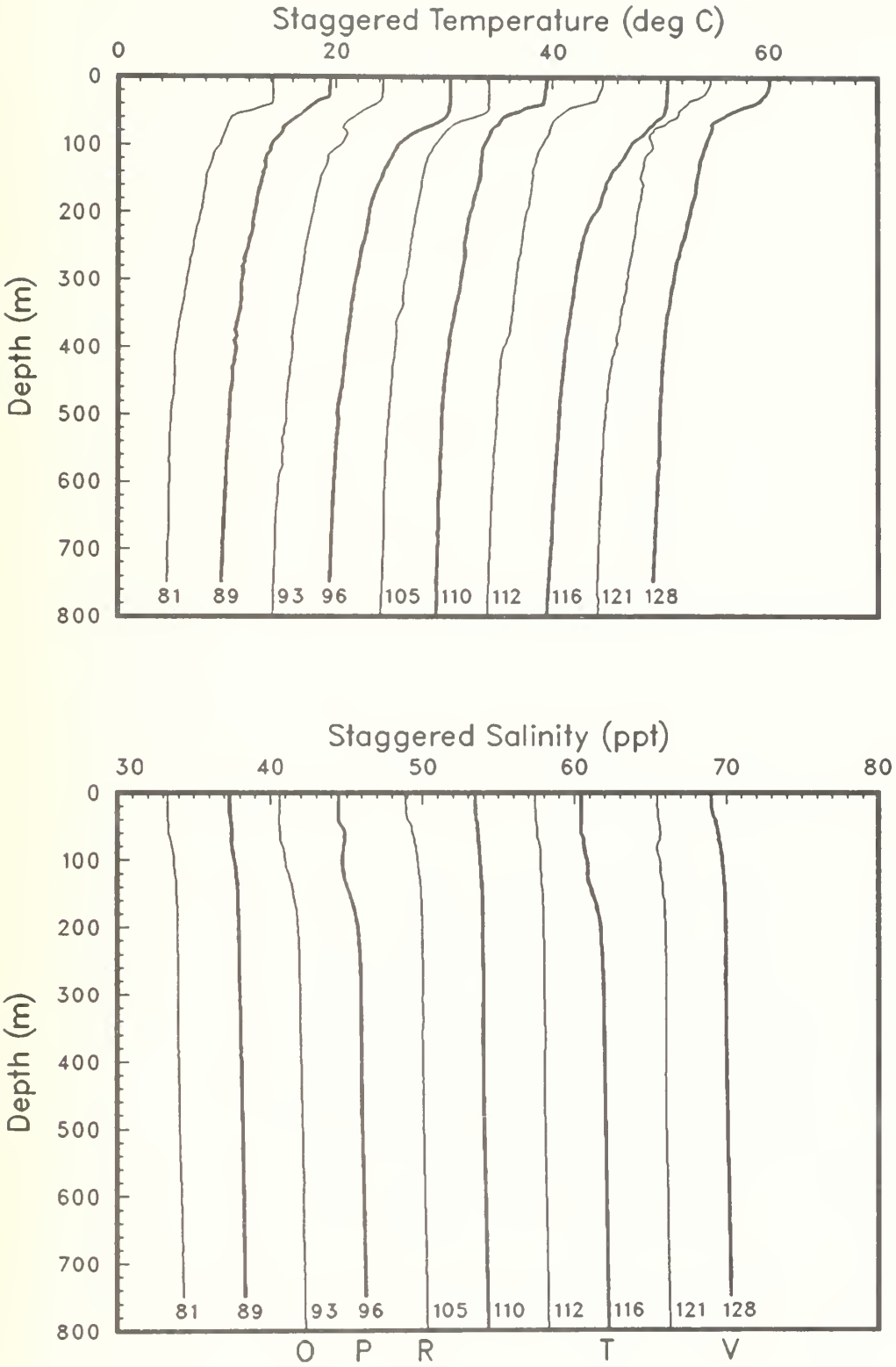

Staggered Temperature (deg C)
0
20
40
60
Depth (m)
0
100
200
300
400
500
600
700
800
81
89
93
96
105
110
112
116
121
128
Staggered Salinity (ppt)
30
40
50
60
70
80
O
P
R
T
V

Figure 60(b).

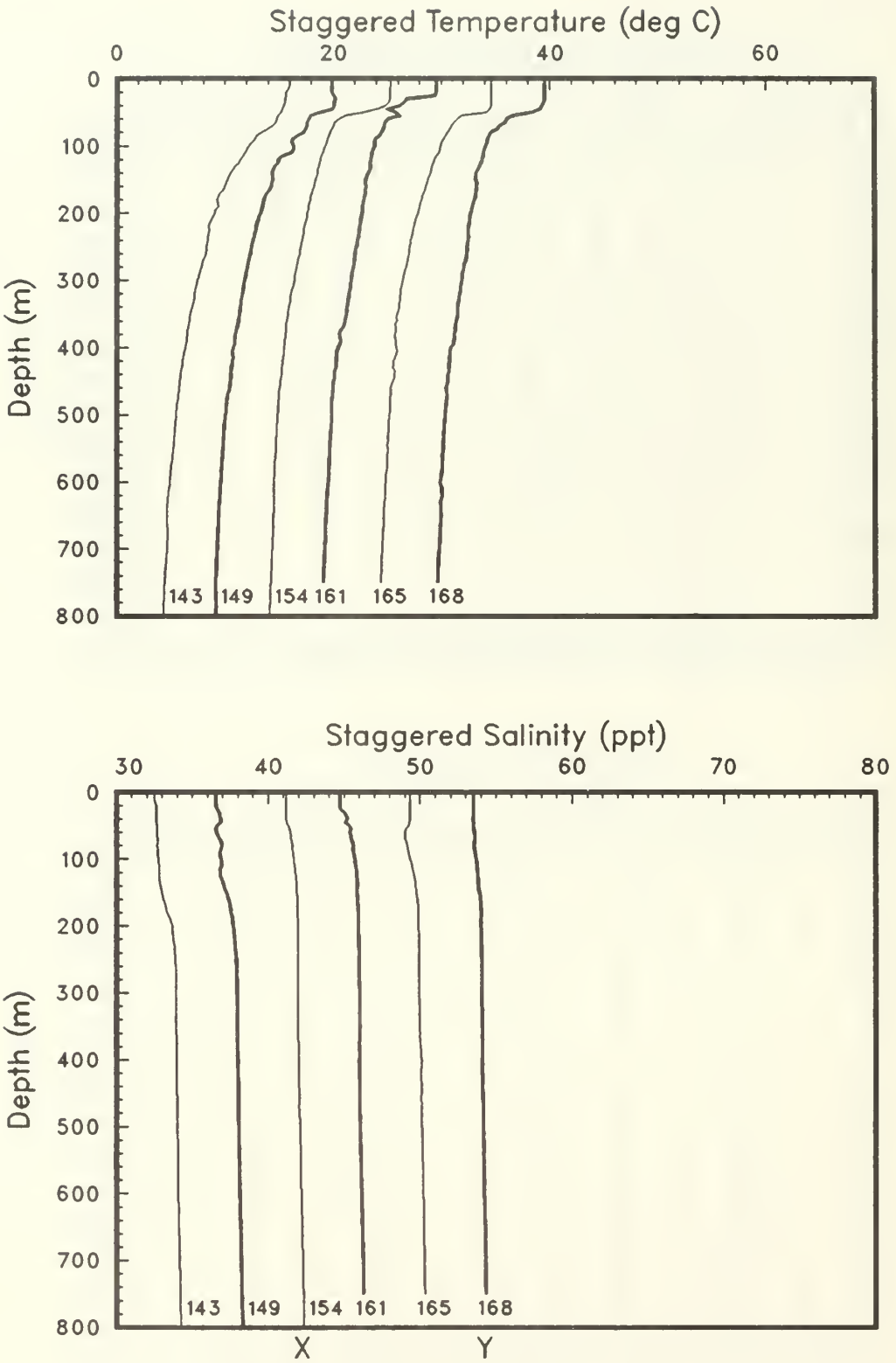

Staggered Temperature (deg C)
0
20
40
60
Depth (m)
0
100
200
300
400
500
600
700
800
143
149
154
161
165
168
Staggered Salinity (ppt)
30
40
50
60
70
80
Depth (m)
0
100
200
300
400
500
600
700
800
143
149
154
161
165
168
X
Y

Figure 60(c).

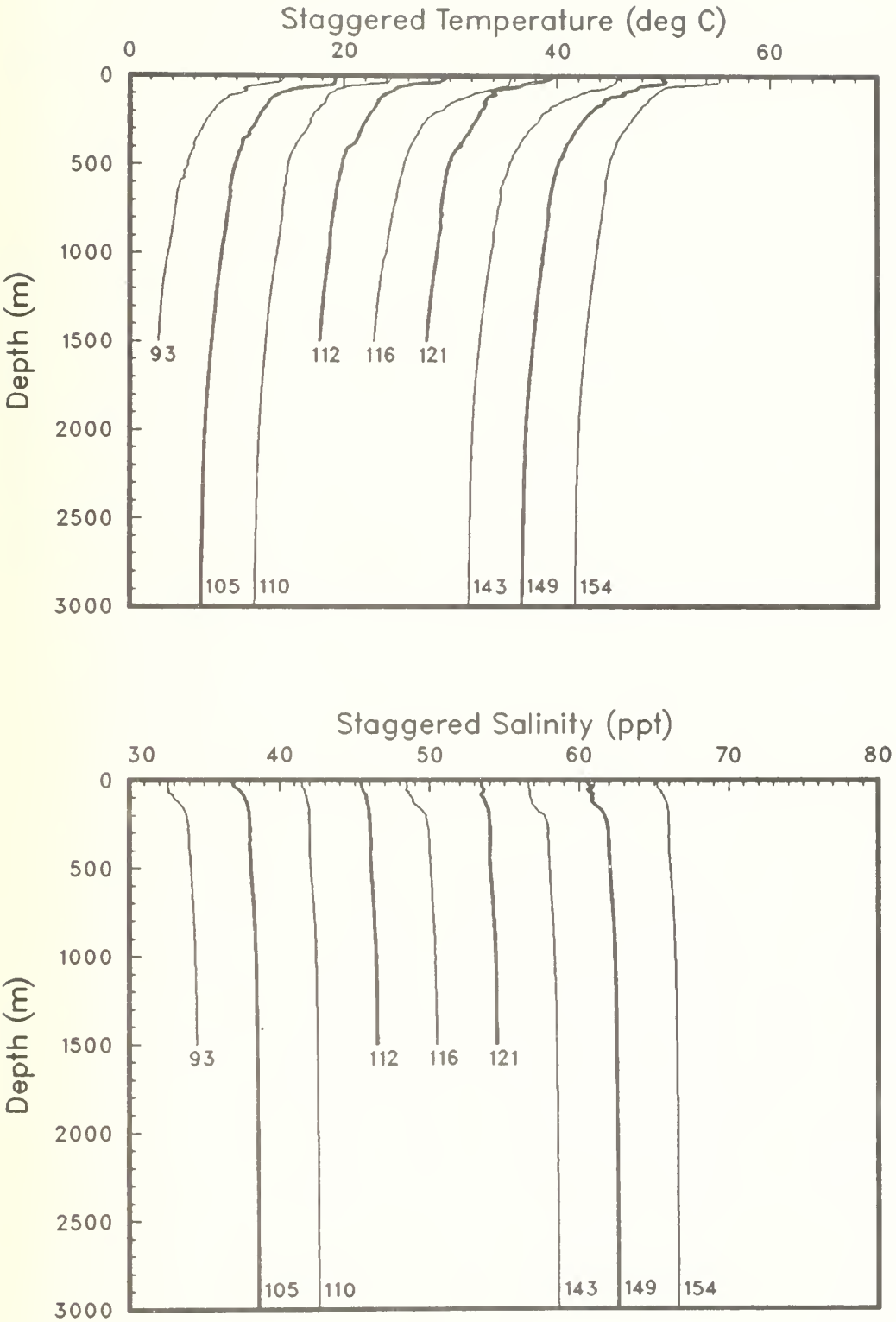


Figure 61: CTD casts deeper than 800m. (OPTOMA11, Leg DIII).

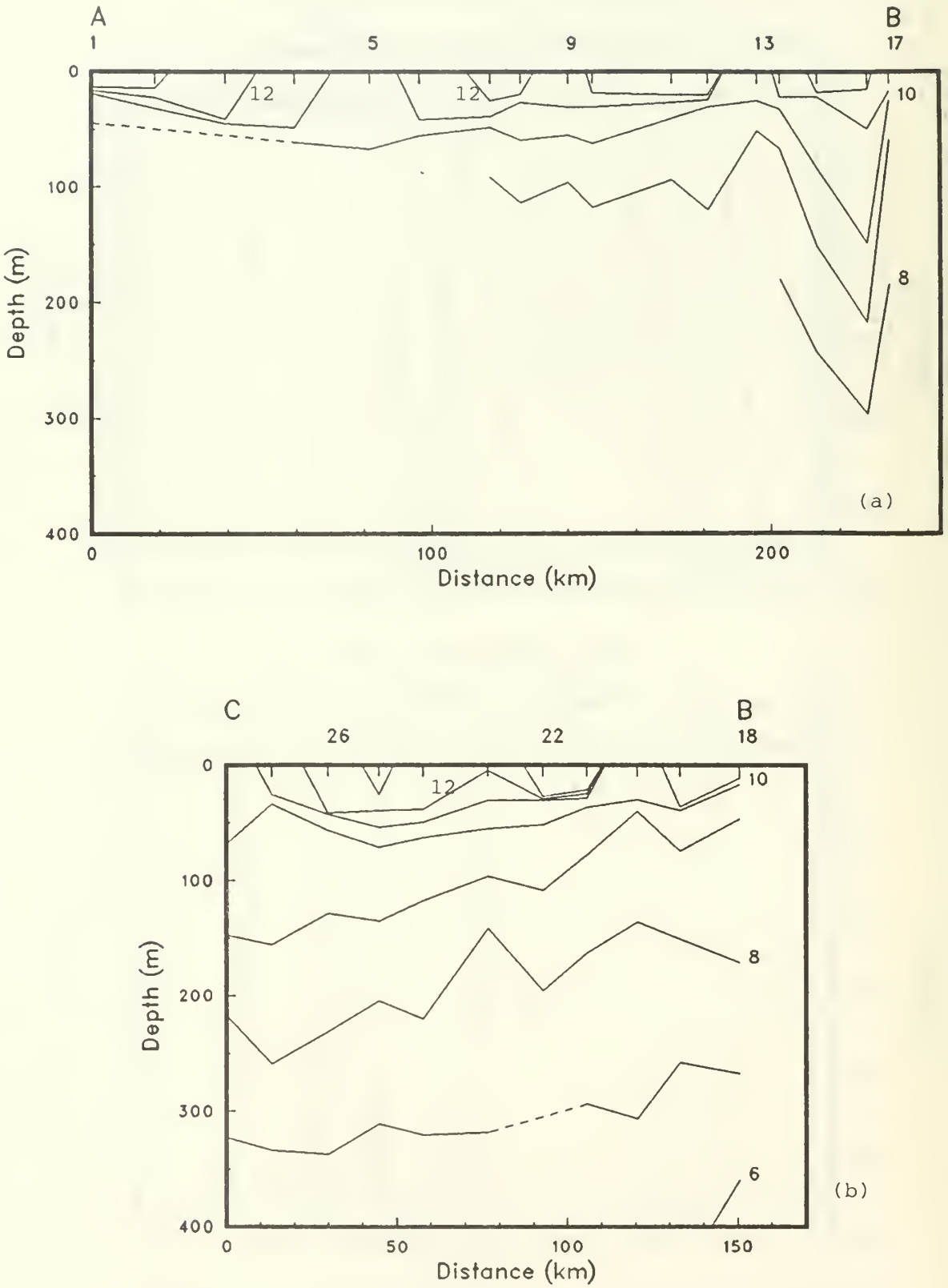


Figure 62(a), (b): Along-track isotherms. Tick marks along the upper horizontal axis show station positions. Some station numbers are given. Dashed lines are used if the cast was too shallow. (OPTOMA11, Leg DIII).

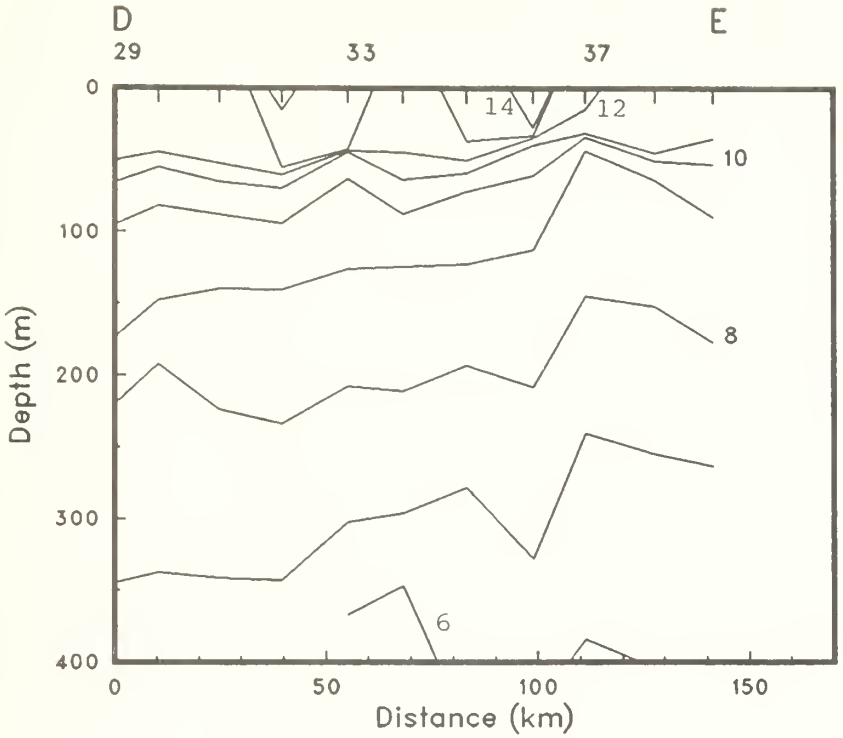


Figure 62(c).

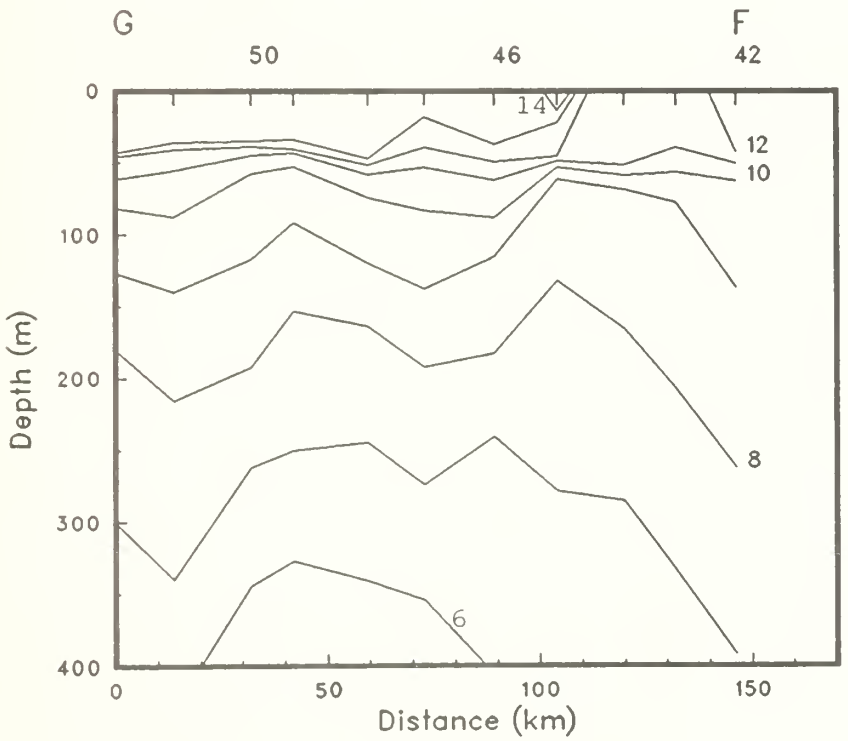


Figure 62(d).

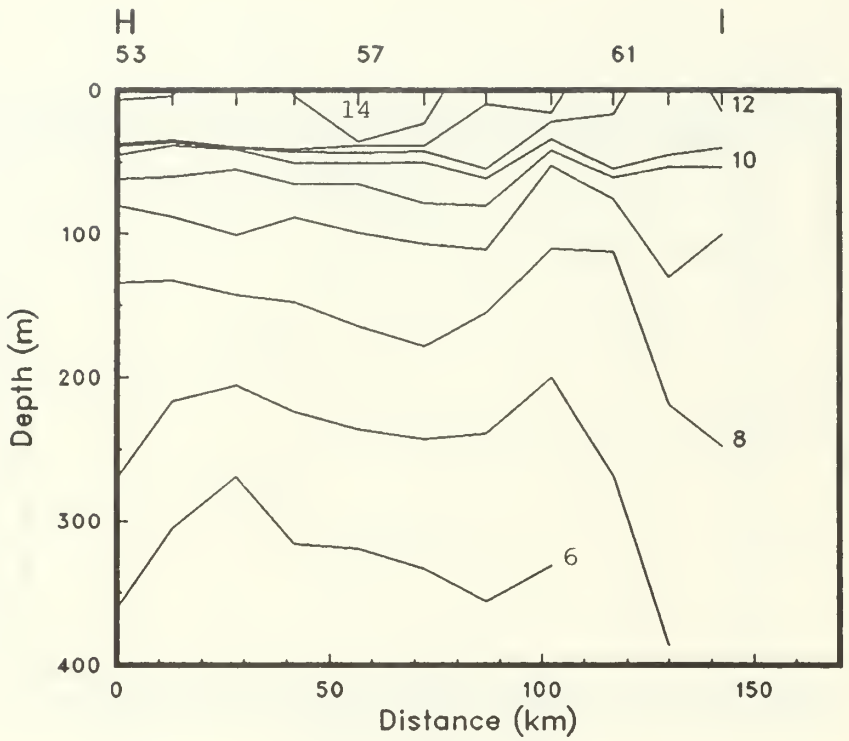


Figure 62(e).

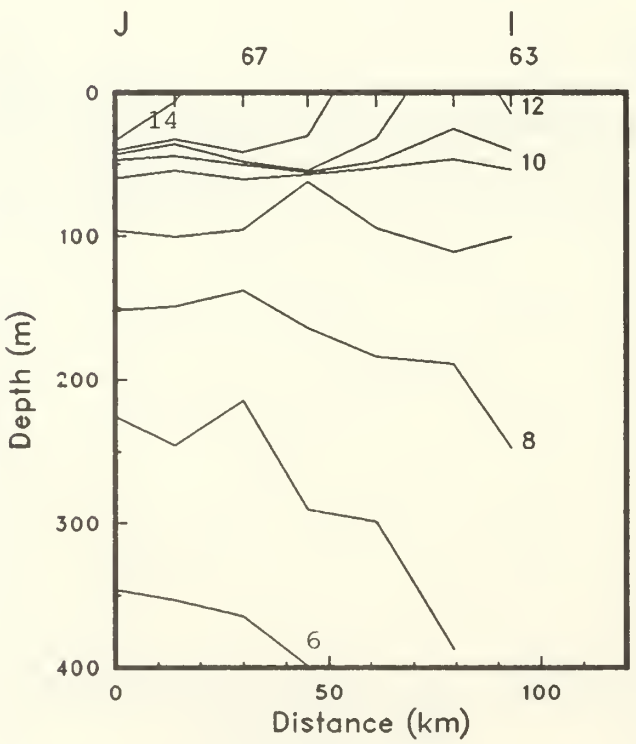


Figure 62(f).

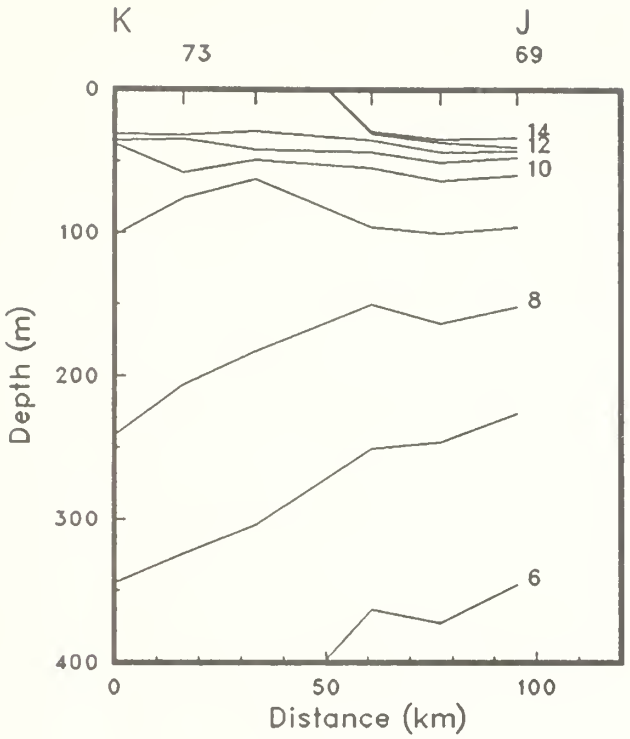


Figure 62(g).

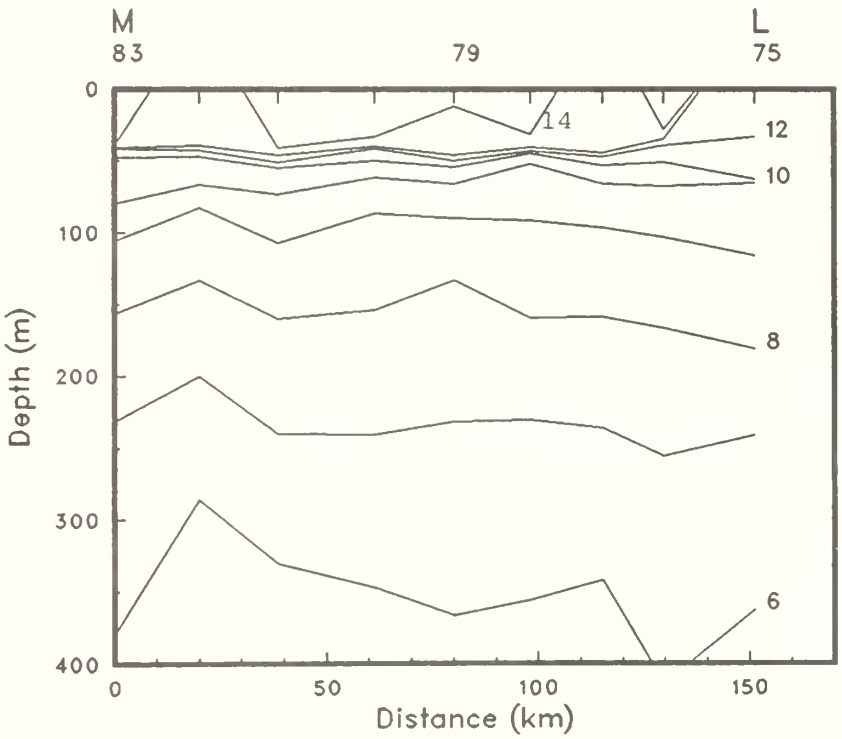


Figure 62(h).

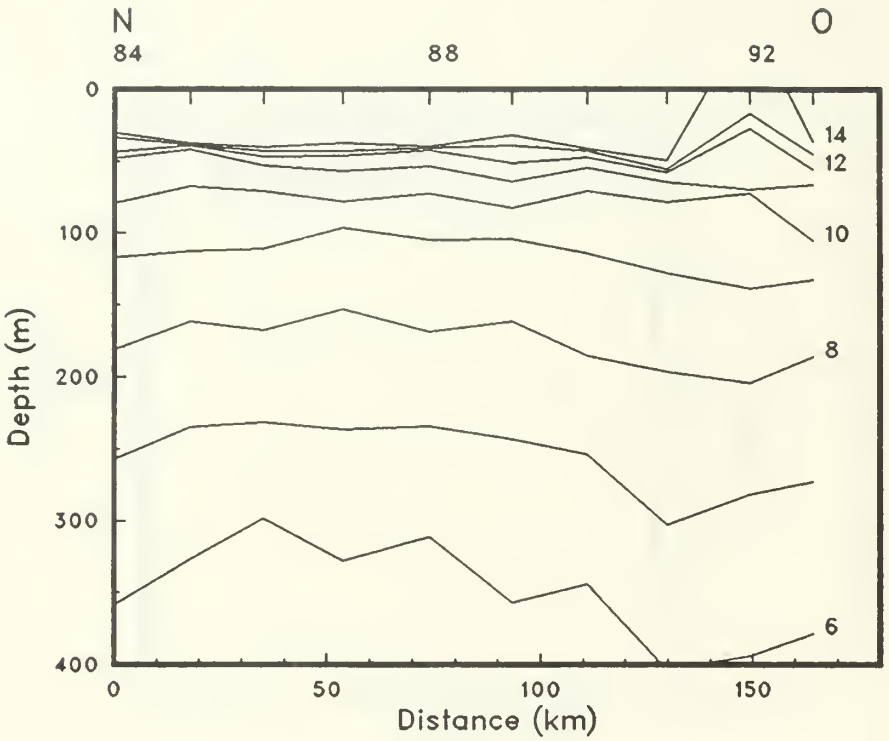


Figure 62(i).

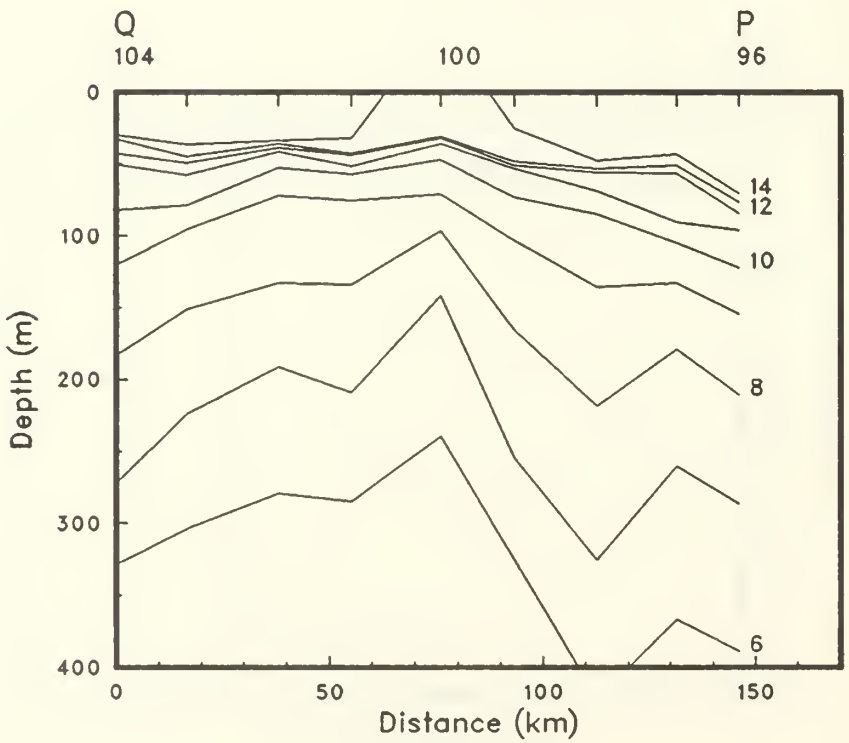


Figure 62(j).

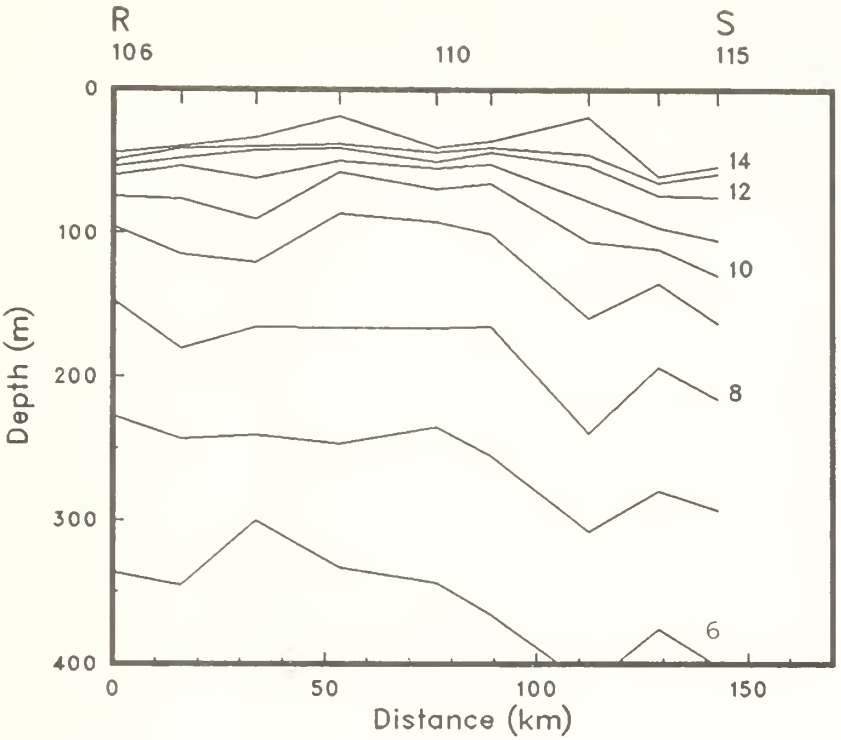


Figure 62(k).

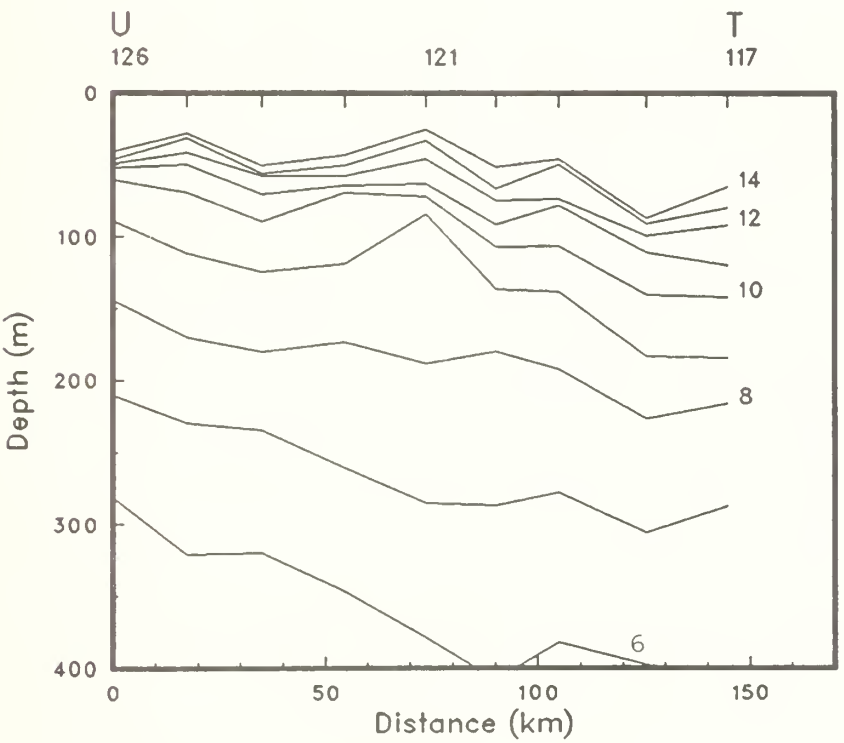


Figure 62(l).

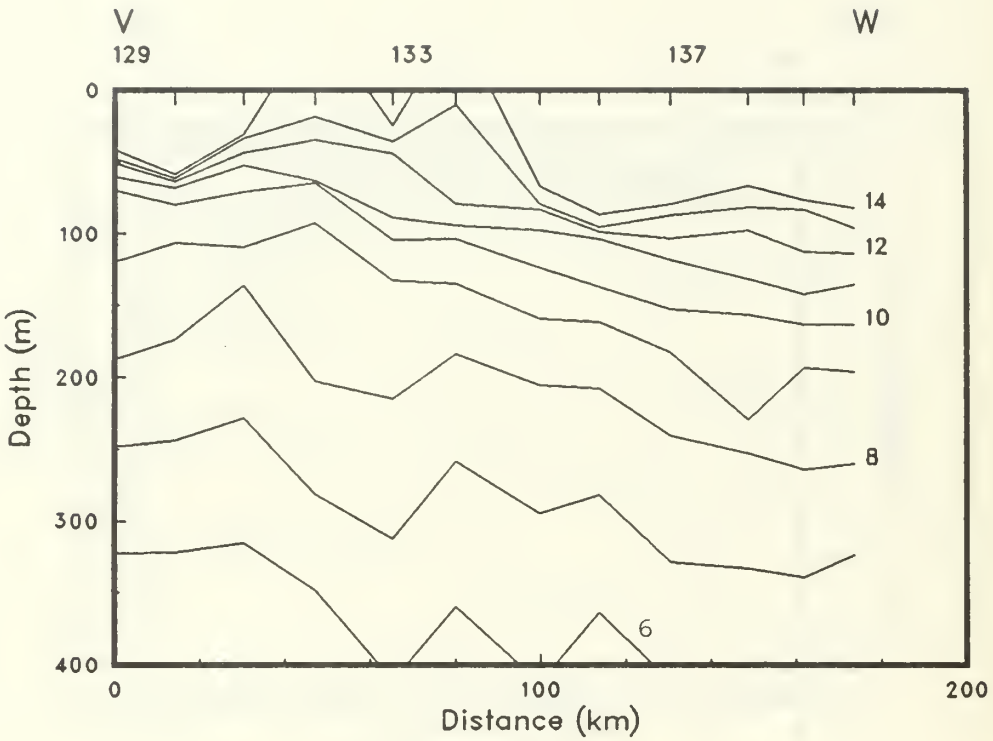


Figure 62(m).

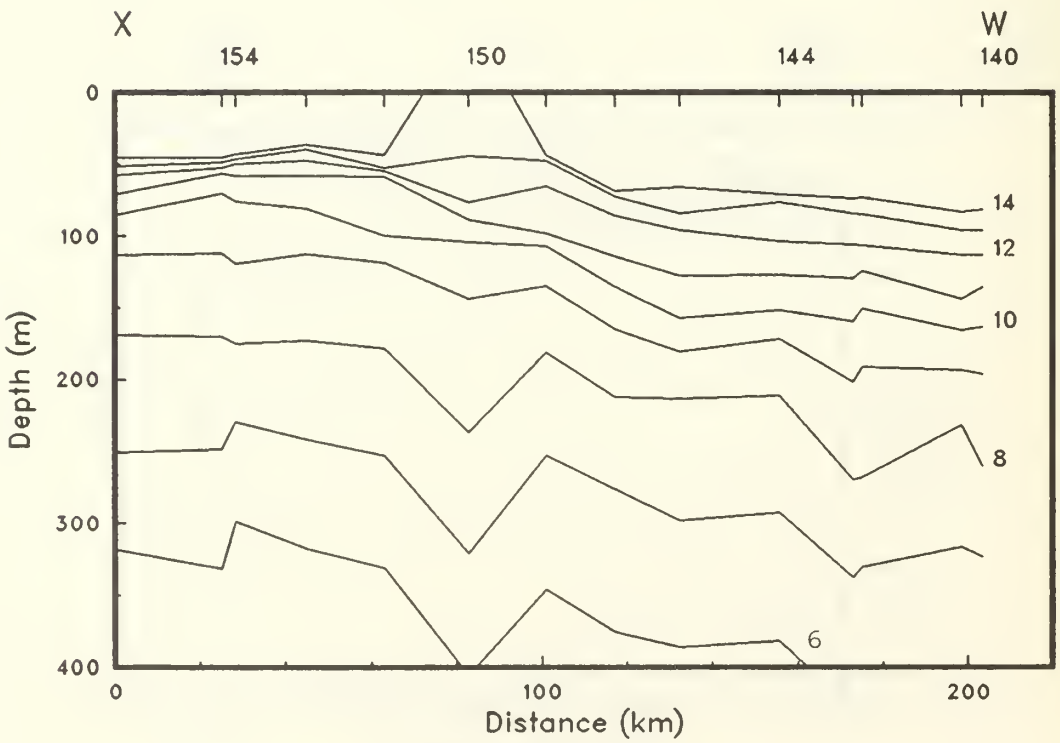


Figure 62(n).

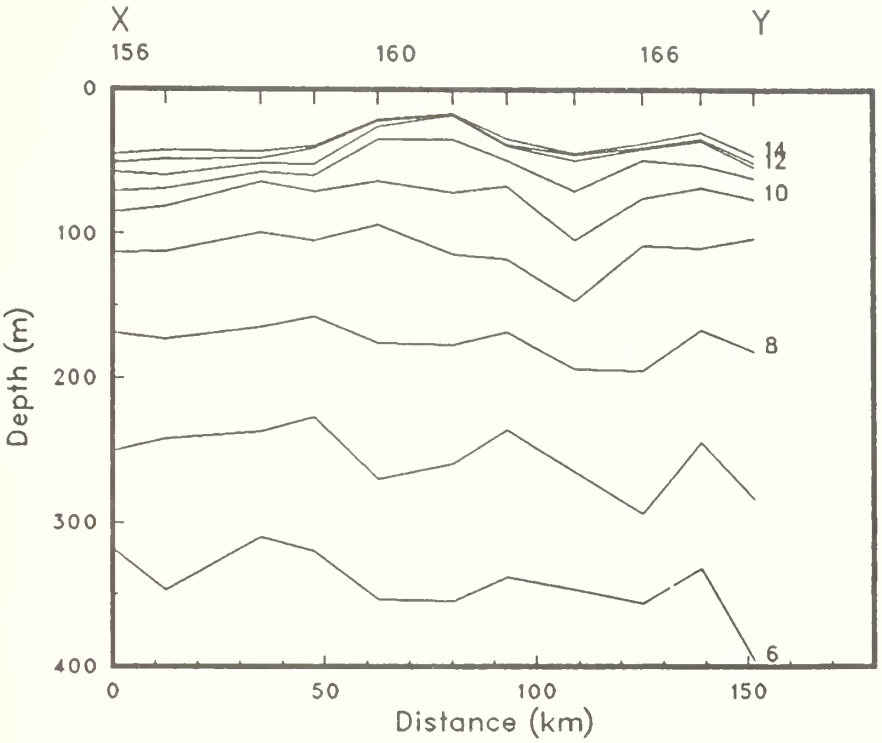


Figure 62(o).

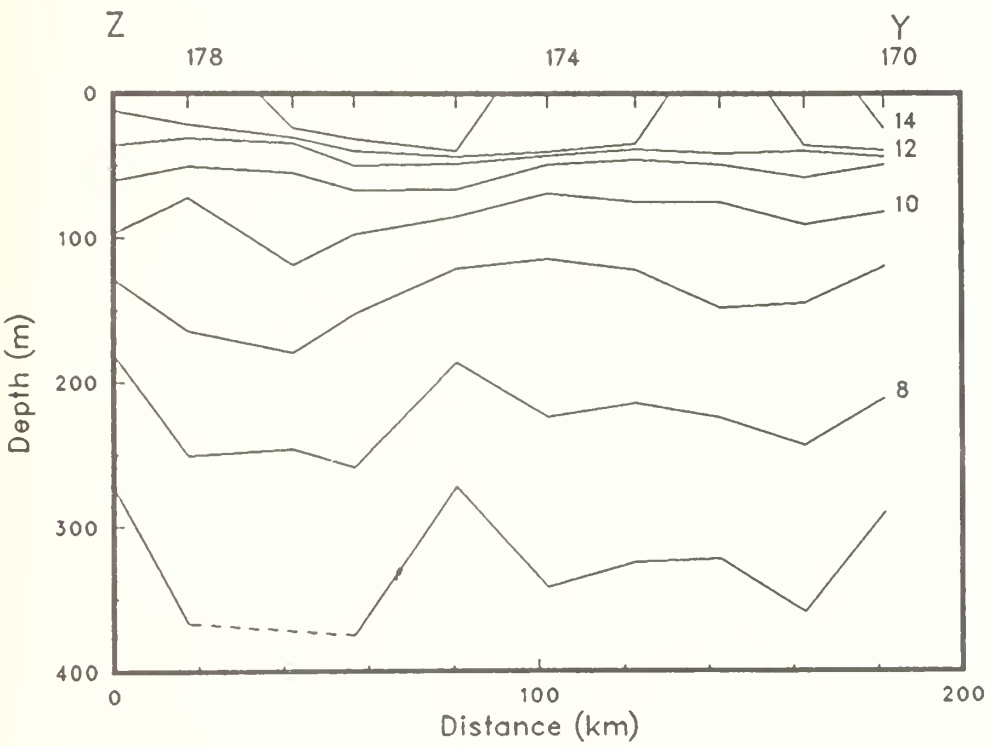


Figure 62(p).

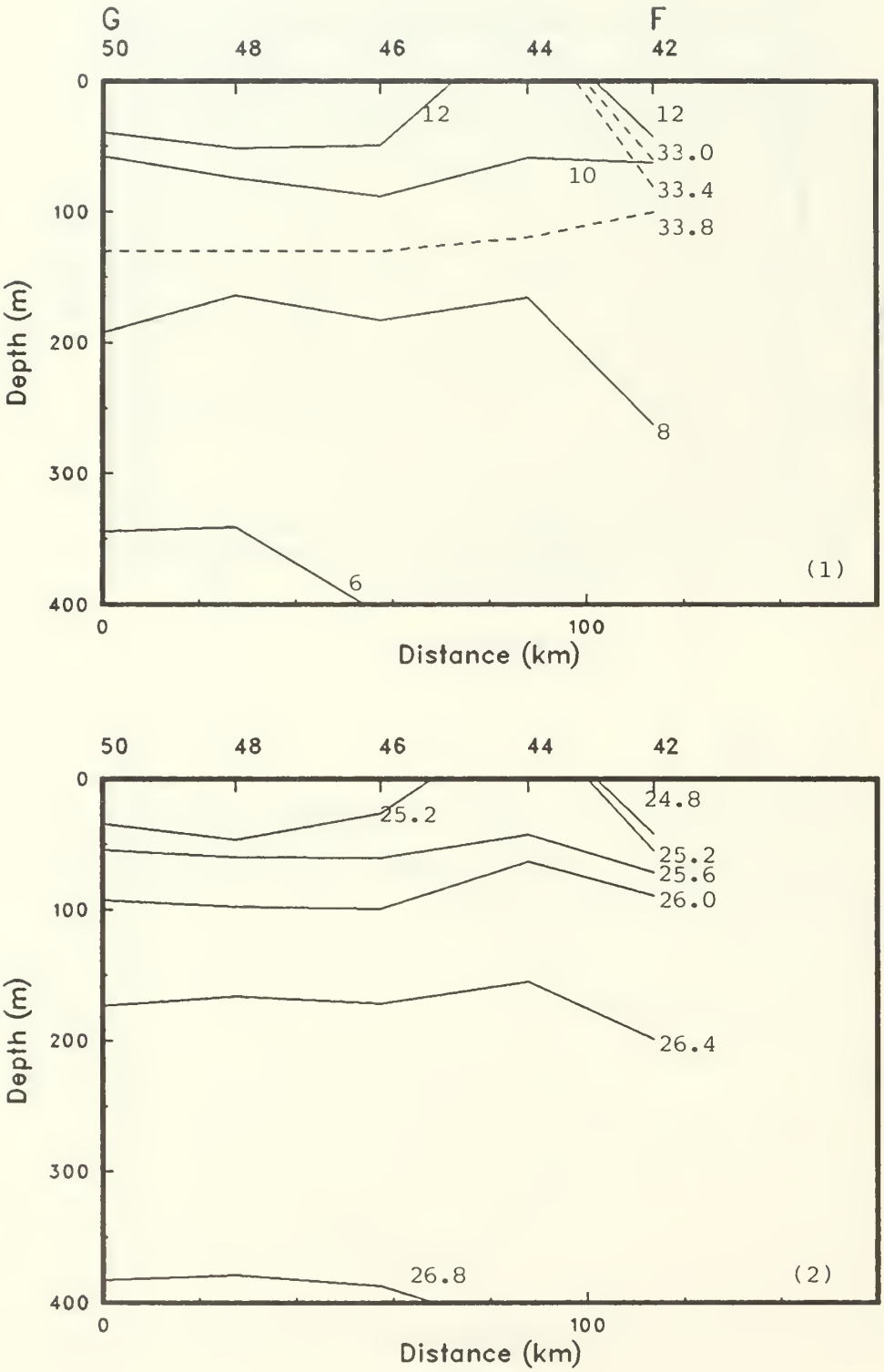


Figure 63(a): Isopleths of (1) temperature and salinity and (2) sigma-t from the CTD's. (OPTOMA11, Leg DIII).

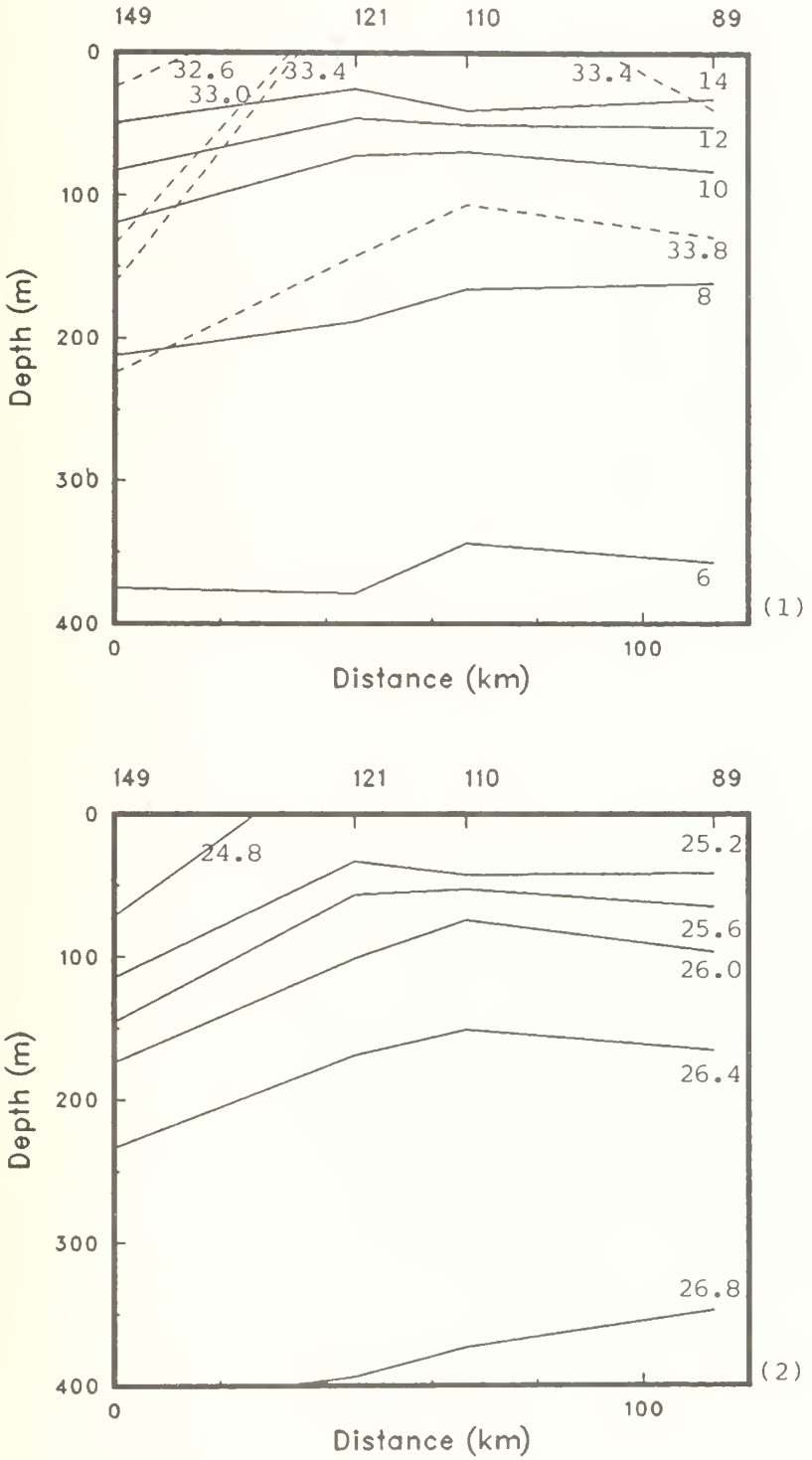

149
121
110
89
0
100
200
300
400
Depth (m)
32.6
33.0
33.4
33.4
14
12
10
33.8
8
6
(1)
0
100
Distance (km)
149
121
110
89
0
100
200
300
400
Depth (m)
24.8
25.2
25.6
26.0
26.4
26.8
(2)
0
100
Distance (km)

Figure 63(b).

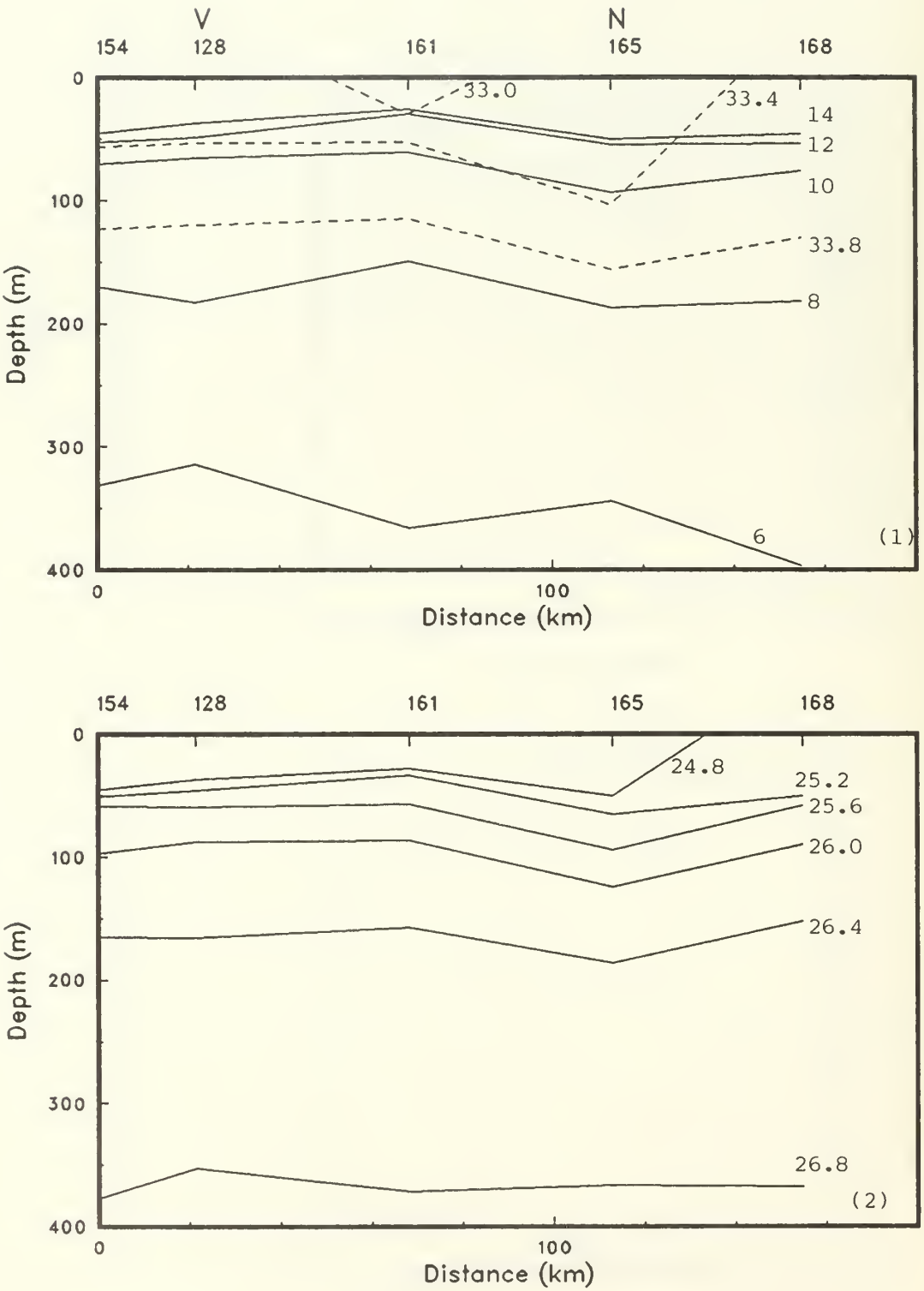

V
N
154
128
161
165
168
0
100
200
300
400
Depth (m)
33.0
33.4
14
12
10
33.8
8
6
(1)
0
100
Distance (km)
154
128
161
165
168
0
100
200
300
400
Depth (m)
24.8
25.2
25.6
26.0
26.4
26.8
(2)
0
100
Distance (km)

Figure 63(c).

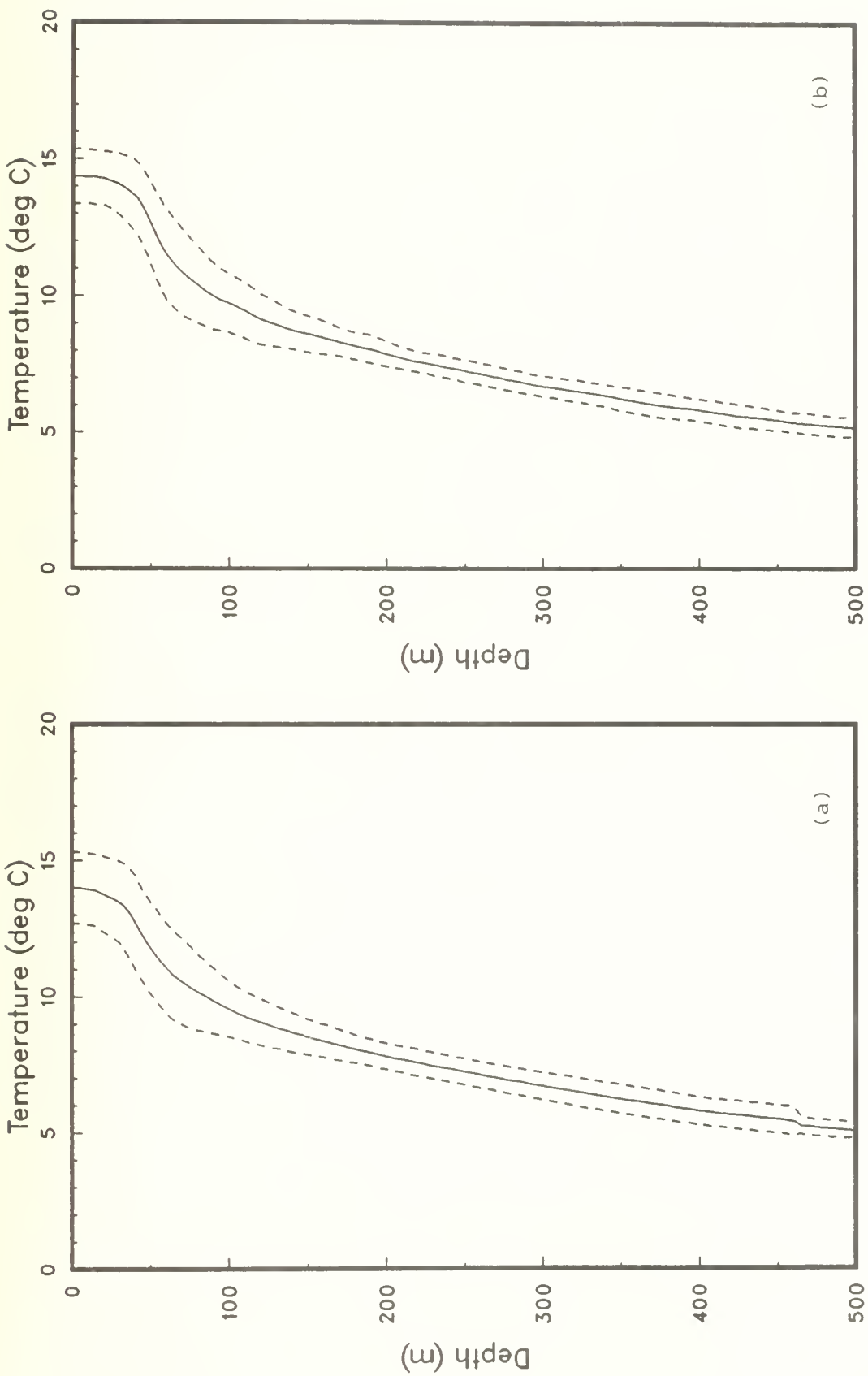


Figure 64: Mean temperature profiles from (a) XBT's and (b) CTD's, with + and - the standard deviation. (OPTOMA11, Leg DIII).

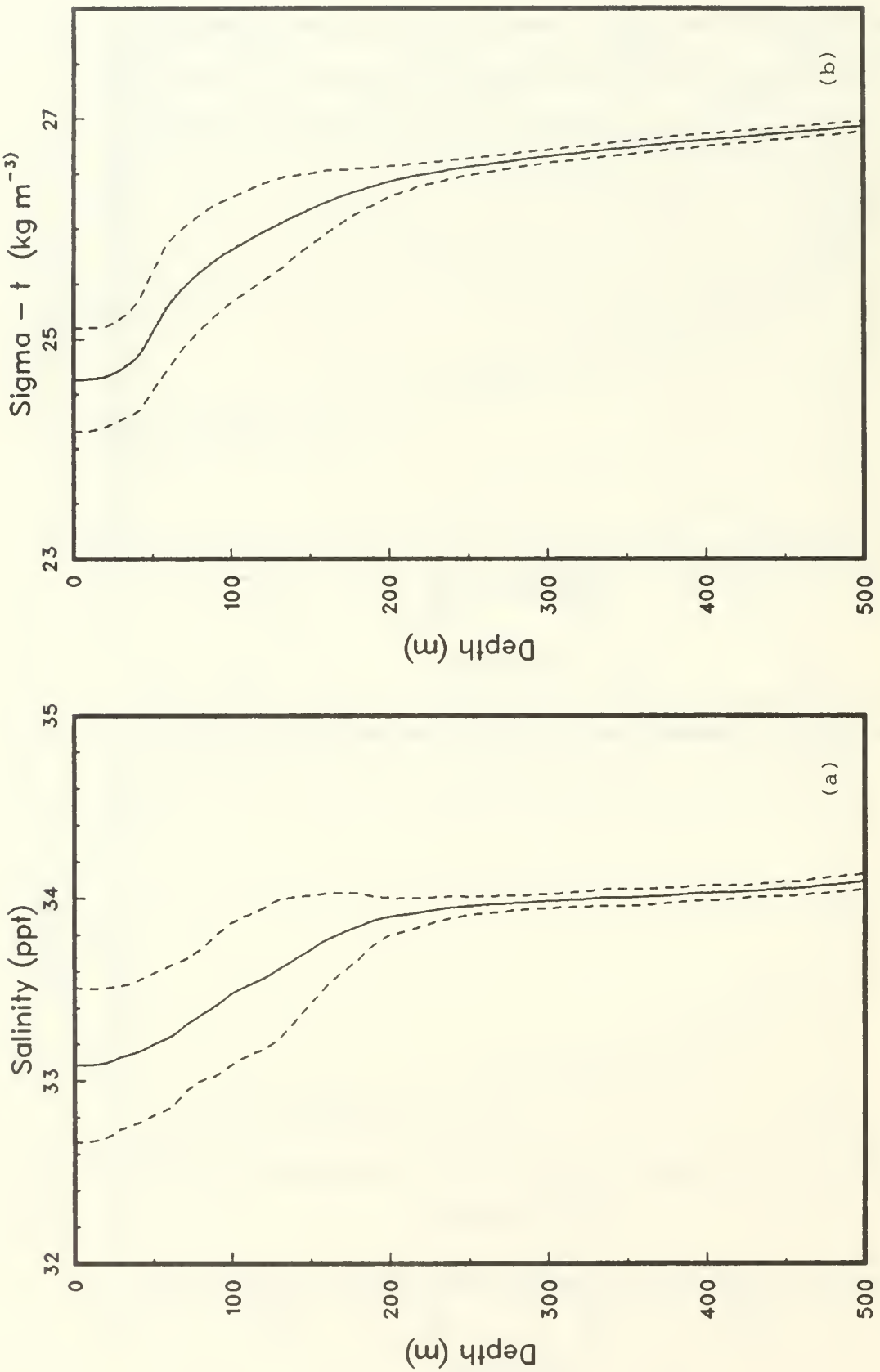


Figure 65: Mean profiles of (a) salinity and (b) sigma-t, with + and - the standard deviations, from the CTD's. (OPTOMA11, Leg DIII).

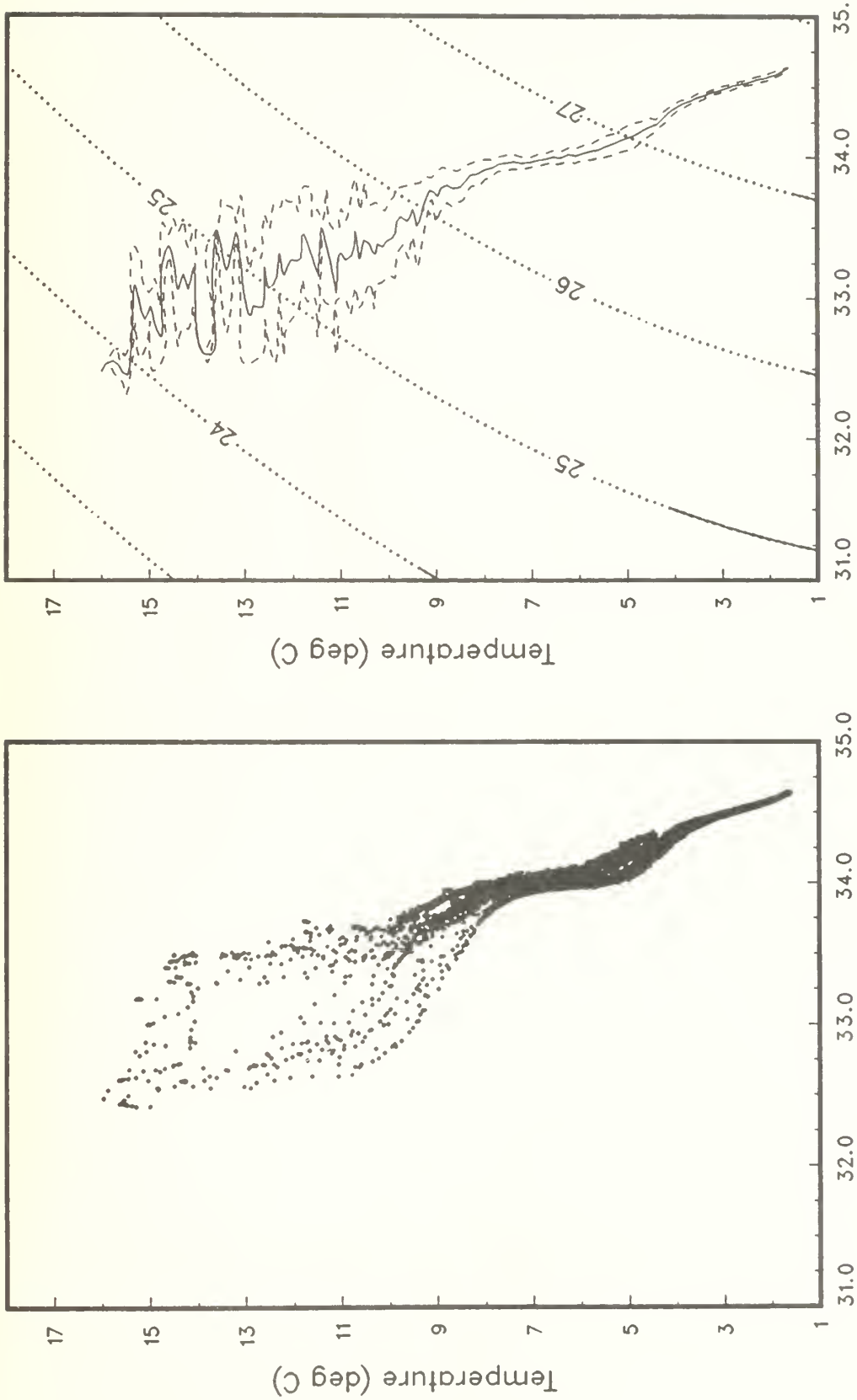


Figure 66: (a) T-S pairs and (b) mean T-S relation, with + and - the standard deviation, from the CTD's. Selected sigma-t contours are also shown. (OPTOMA11, Leg DIII).

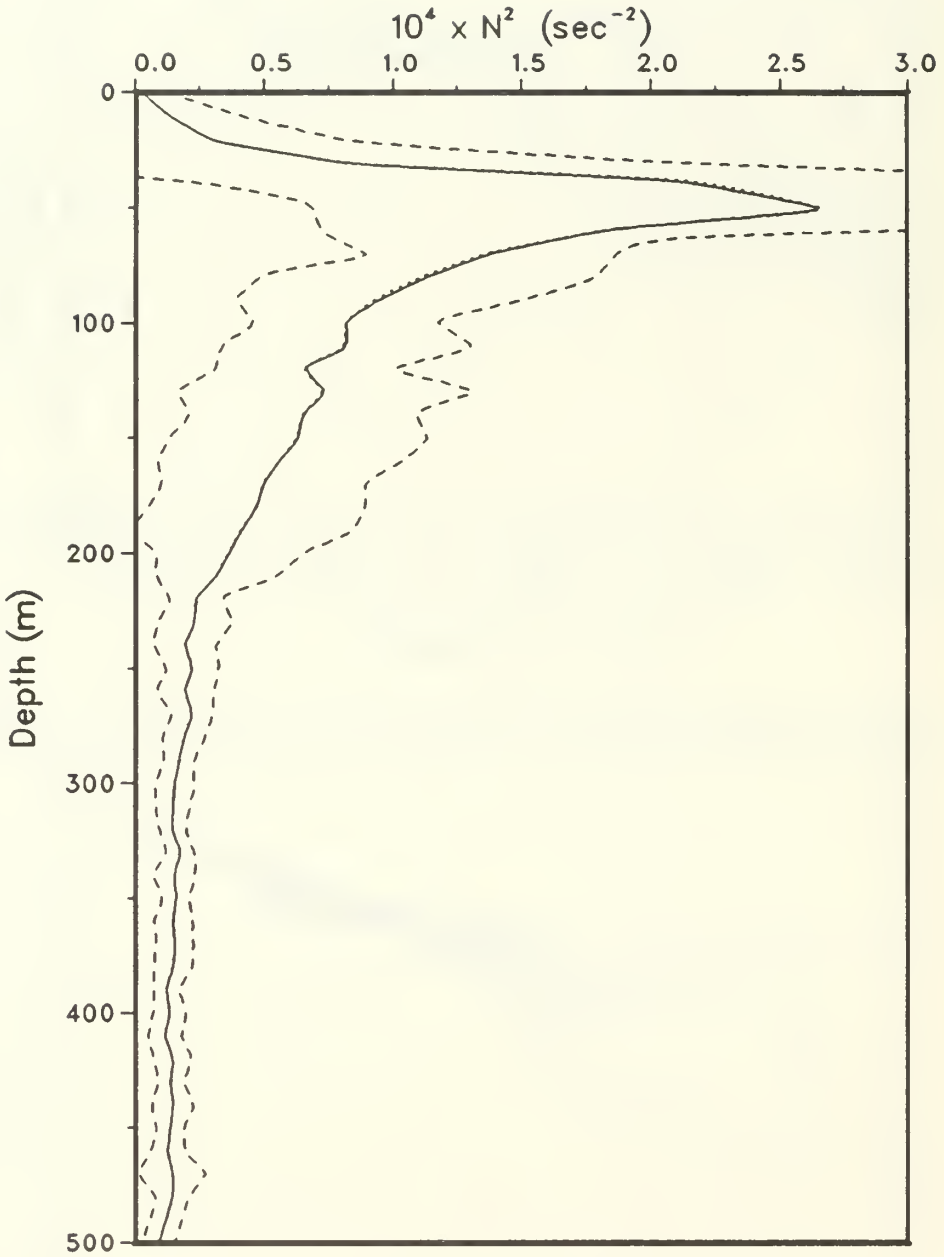


Figure 67: Mean N^2 profile (——), with + and - the standard deviation (----). The N^2 profile from $\overline{T(z)}$ and $\overline{S(z)}$ is also shown (••••). (OPTOMA11, Leg DIII).

Section 7

OPTOMA11 Leg P

18 July, 1984

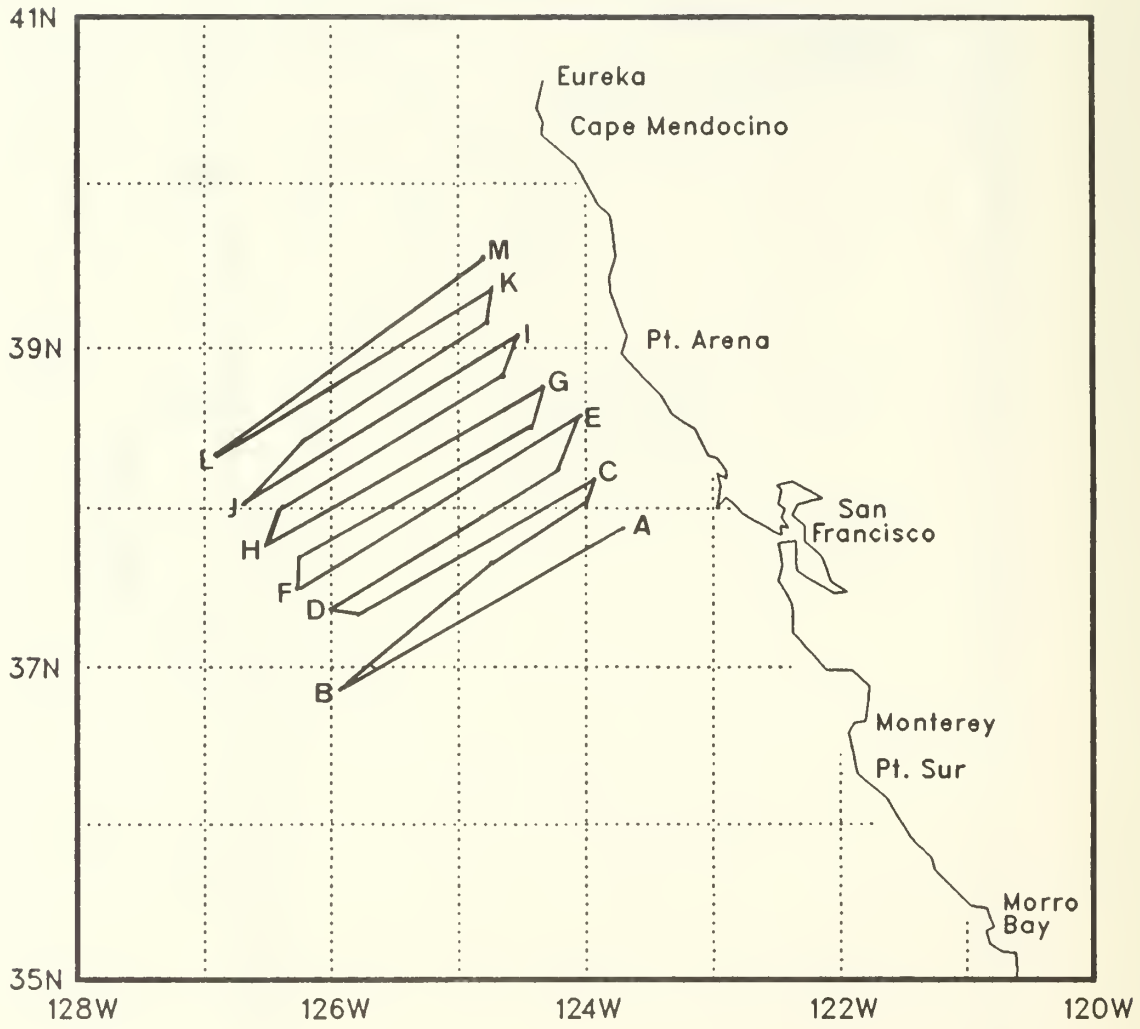


Figure 68: The flight track for OPTOMA11, Leg P.

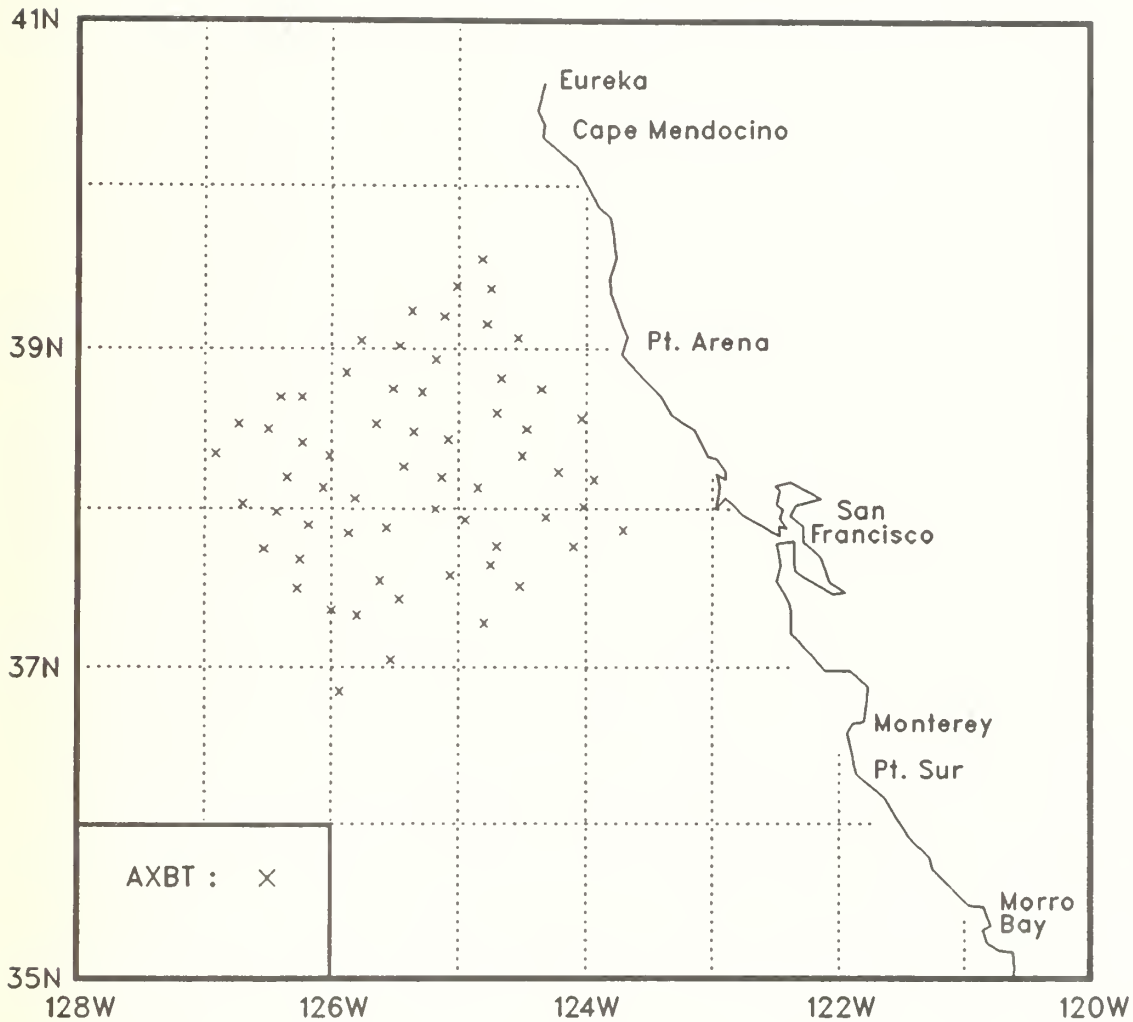


Figure 69: AXBT locations for OPTOMA11, Leg P.

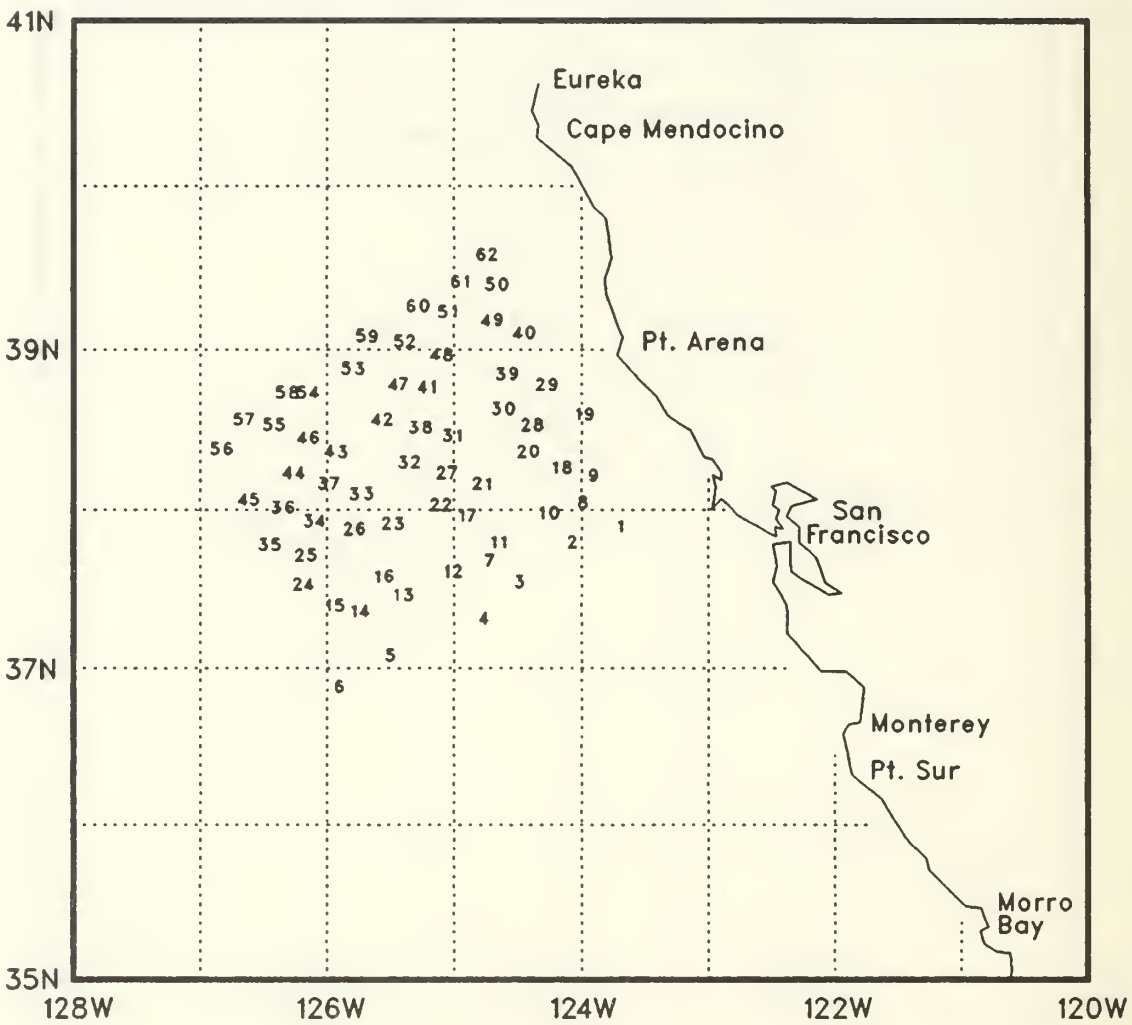


Figure 70: Station numbers for OPTOMA11, Leg P.

Table 8: Leg P Station Listing

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)
1	AXBT	84200	1741	37.52	123.42	14.4
2	AXBT	84200	1748	37.46	124.06	15.0
3	AXBT	84200	1800	37.31	124.31	14.4
4	AXBT	84200	1805	37.17	124.48	15.5
5	AXBT	84200	1814	37.03	125.32	13.9
6	AXBT	84200	1820	36.51	125.56	13.6
7	AXBT	84200	1843	37.39	124.45	14.4
8	AXBT	84200	1851	38.01	124.01	14.4
9	AXBT	84200	1858	38.11	123.56	14.9
10	AXBT	84200	1908	37.57	124.19	14.2
11	AXBT	84200	1913	37.46	124.42	14.3
12	AXBT	84200	1918	37.35	125.04	14.4
13	AXBT	84200	1923	37.26	125.28	14.3
14	AXBT	84200	1927	37.20	125.48	14.2
15	AXBT	84200	1937	37.22	126.00	12.7
16	AXBT	84200	1944	37.33	125.37	12.7
17	AXBT	84200	1956	37.56	124.57	13.0
18	AXBT	84200	2007	38.14	124.13	13.9
19	AXBT	84200	2012	38.34	124.02	13.1
20	AXBT	84200	2019	38.20	124.30	14.1
21	AXBT	84200	2031	38.08	124.51	13.8
22	AXBT	84200	2038	38.00	125.11	13.3
23	AXBT	84200	2048	37.53	125.34	13.2
24	AXBT	84200	2104	37.30	126.16	15.2
25	AXBT	84200	2110	37.41	126.15	15.1
26	AXBT	84200	2116	37.51	125.52	14.9
27	AXBT	84200	2127	38.12	125.08	14.0
28	AXBT	84200	2137	38.30	124.28	13.5
29	AXBT	84200	2140	38.45	124.21	13.1
30	AXBT	84200	2148	38.36	124.42	13.7
31	AXBT	84200	2154	38.26	125.05	13.7
32	AXBT	84200	2159	38.16	125.26	13.3
33	AXBT	84200	2204	38.04	125.49	15.5
34	AXBT	84200	2208	37.54	126.11	15.5
35	AXBT	84200	2212	37.45	126.32	13.6
36	AXBT	84200	2220	37.59	126.26	15.3
37	AXBT	84200	2226	38.08	126.04	15.4
38	AXBT	84200	2237	38.29	125.21	13.4
39	AXBT	84200	2248	38.49	124.40	13.1
40	AXBT	84200	2251	39.04	124.32	12.7
41	AXBT	84200	2304	38.44	125.17	12.9
42	AXBT	84200	2310	38.32	125.39	12.7
43	AXBT	84200	2316	38.20	126.01	15.3
44	AXBT	84200	2321	38.12	126.21	15.4
45	AXBT	84200	2326	38.02	126.42	15.4

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)
46	AXBT	84200	2342	38.25	126.14	15.3
47	AXBT	84200	2354	38.45	125.31	14.9
48	AXBT	84200	2359	38.56	125.11	12.7
49	AXBT	84200	10	39.09	124.47	13.4
50	AXBT	84200	14	39.22	124.45	14.9
51	AXBT	84200	20	39.12	125.07	15.0
52	AXBT	84200	26	39.01	125.28	14.6
53	AXBT	84200	32	38.51	125.53	15.3
54	AXBT	84200	37	38.42	126.14	15.3
55	AXBT	84200	41	38.30	126.30	15.6
56	AXBT	84200	46	38.21	126.55	15.5
57	AXBT	84200	49	38.32	126.44	15.3
58	AXBT	84200	56	38.42	126.24	14.9
59	AXBT	84200	108	39.03	125.46	15.1
60	AXBT	84200	114	39.14	125.22	14.8
61	AXBT	84200	119	39.23	125.01	15.0
62	AXBT	84200	121	39.33	124.49	14.8

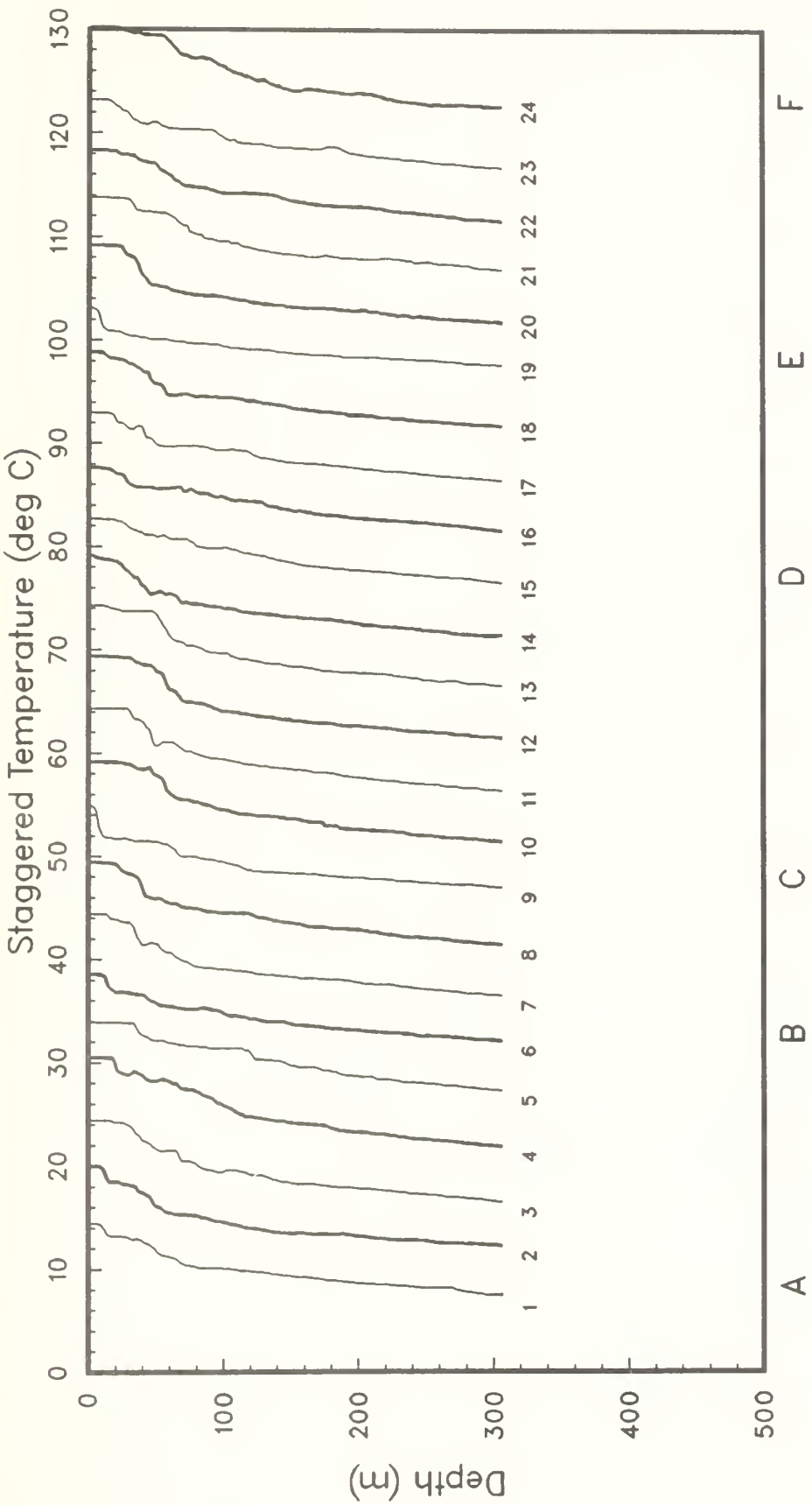


Figure 71(a): AXBT temperature profiles, staggered by multiples of 5C. (OPTOMA11, Leg P).

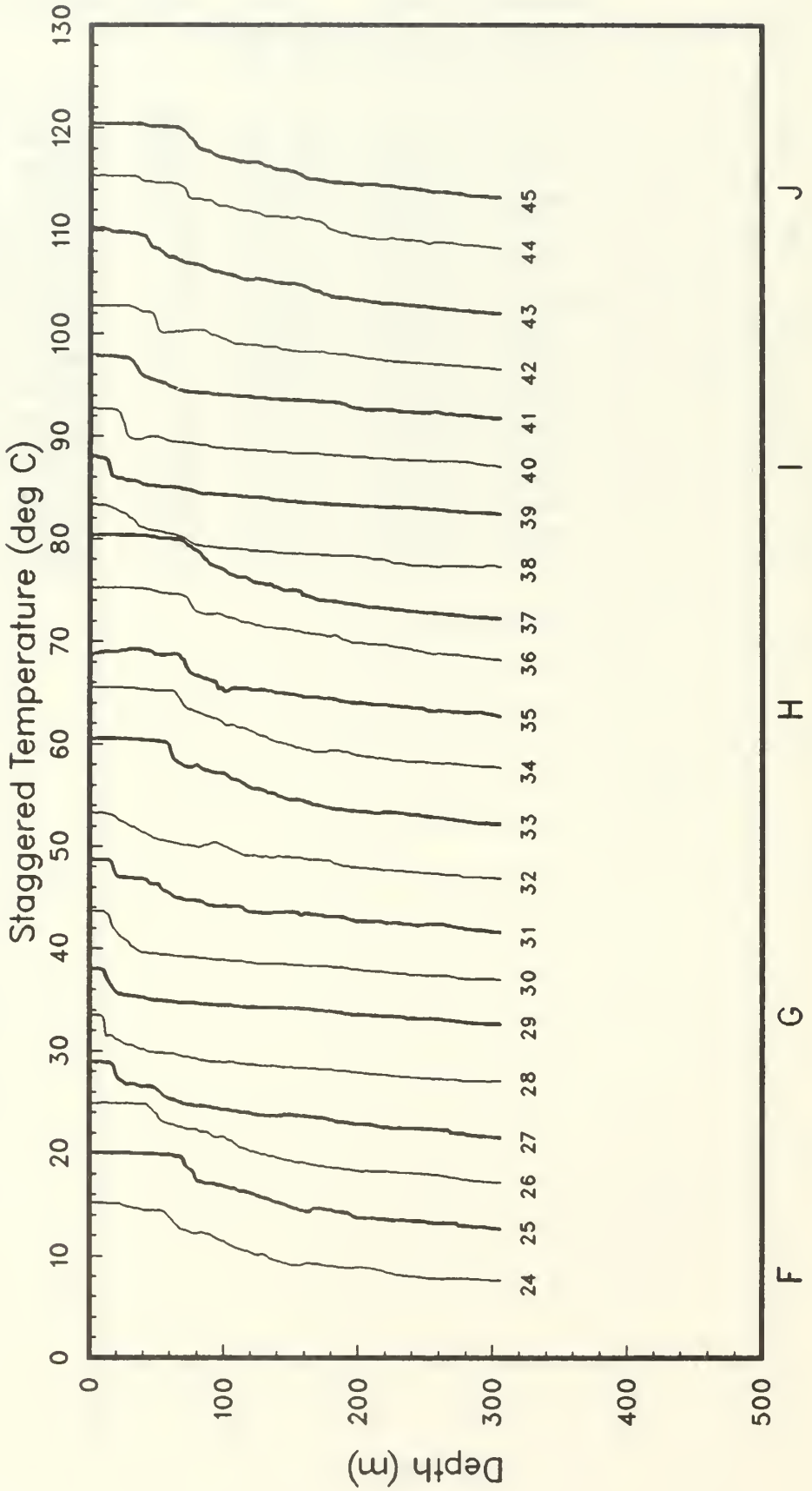

Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
Depth (m)
0
100
200
300
400
500
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
F
G
H
I
J

Figure 71(b).

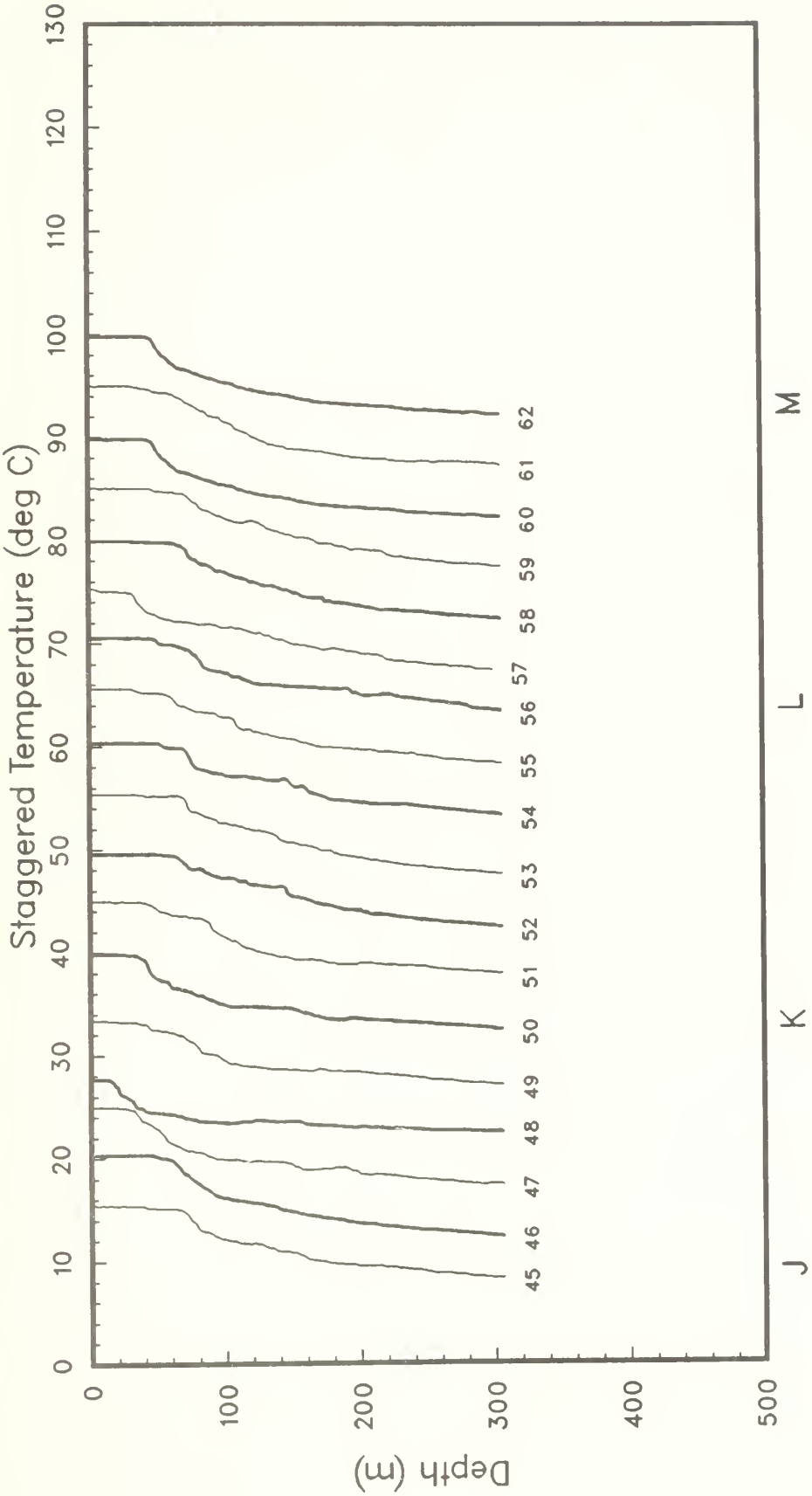

Staggered Temperature (deg C)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
Depth (m)
0
100
200
300
400
500
45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62
J
K
L
M

Figure 71(c).

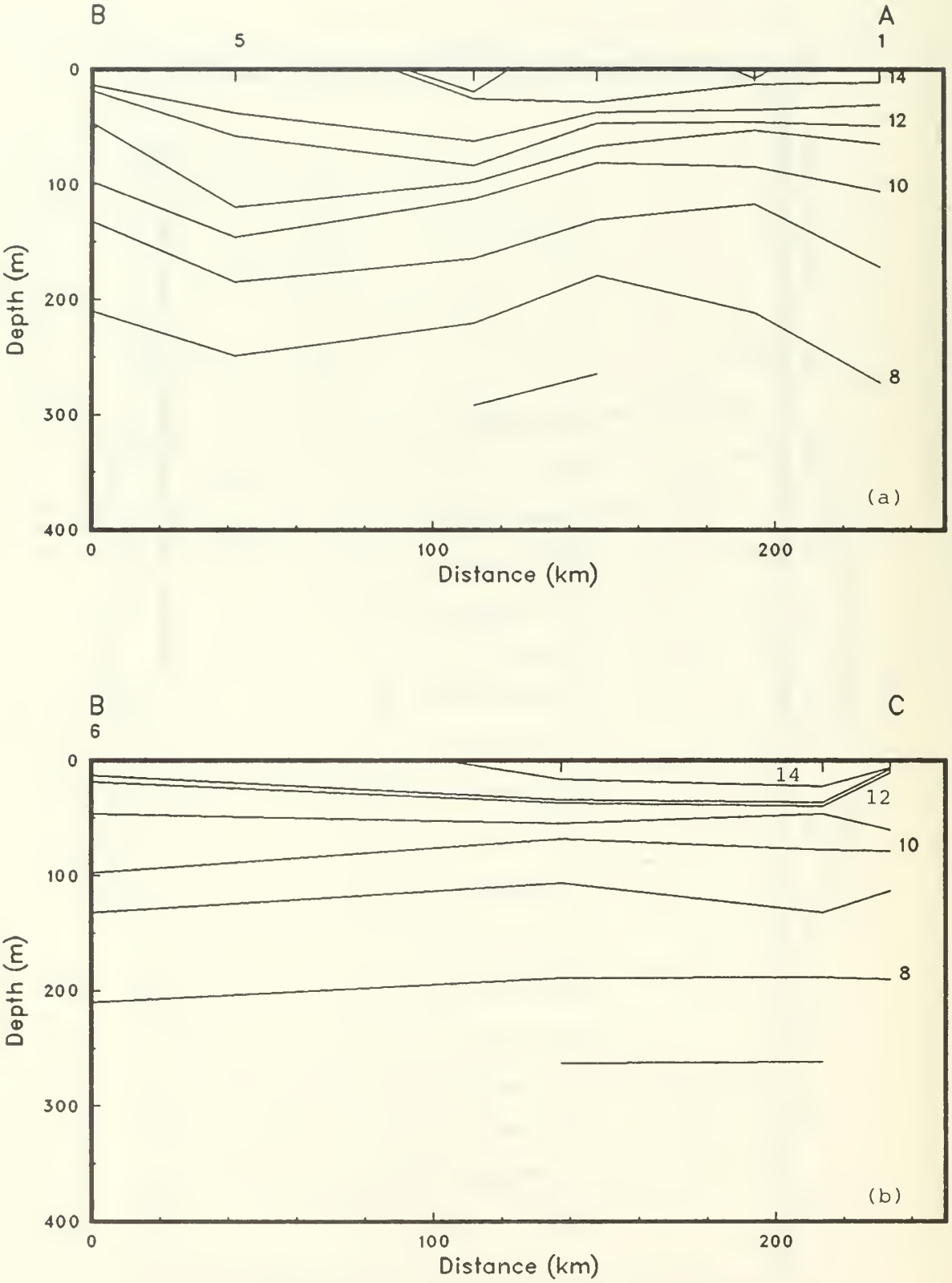


Figure 72(a), (b): Along-track isotherms. Tick marks along the upper horizontal axis show station positions. Some station numbers are given. Dashed lines are used if the cast was too shallow. (OPTOMA11, Leg P).

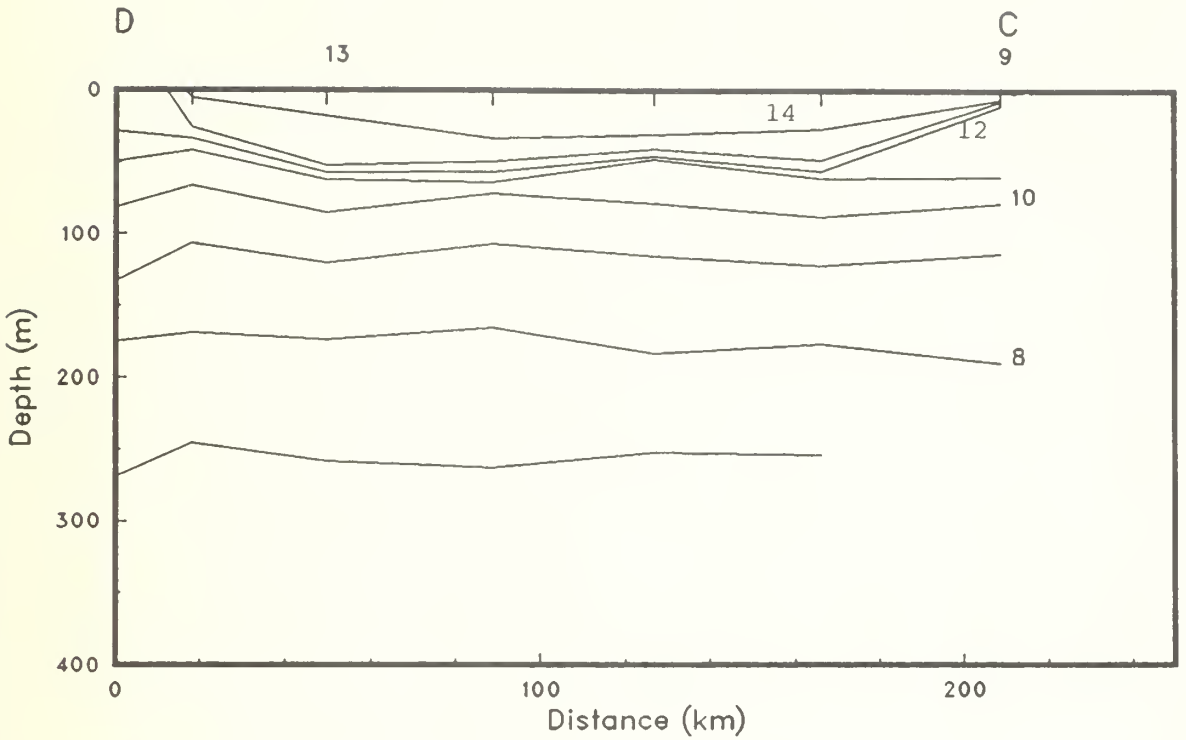


Figure 72(c).

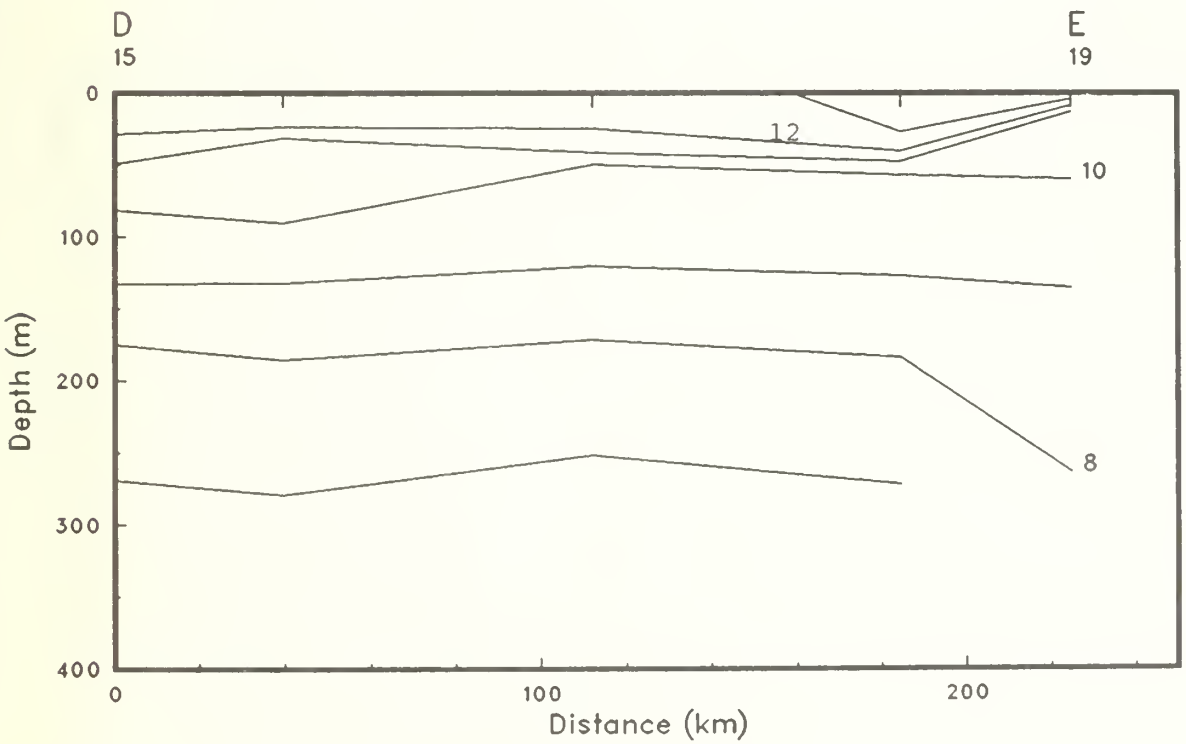


Figure 72(d).

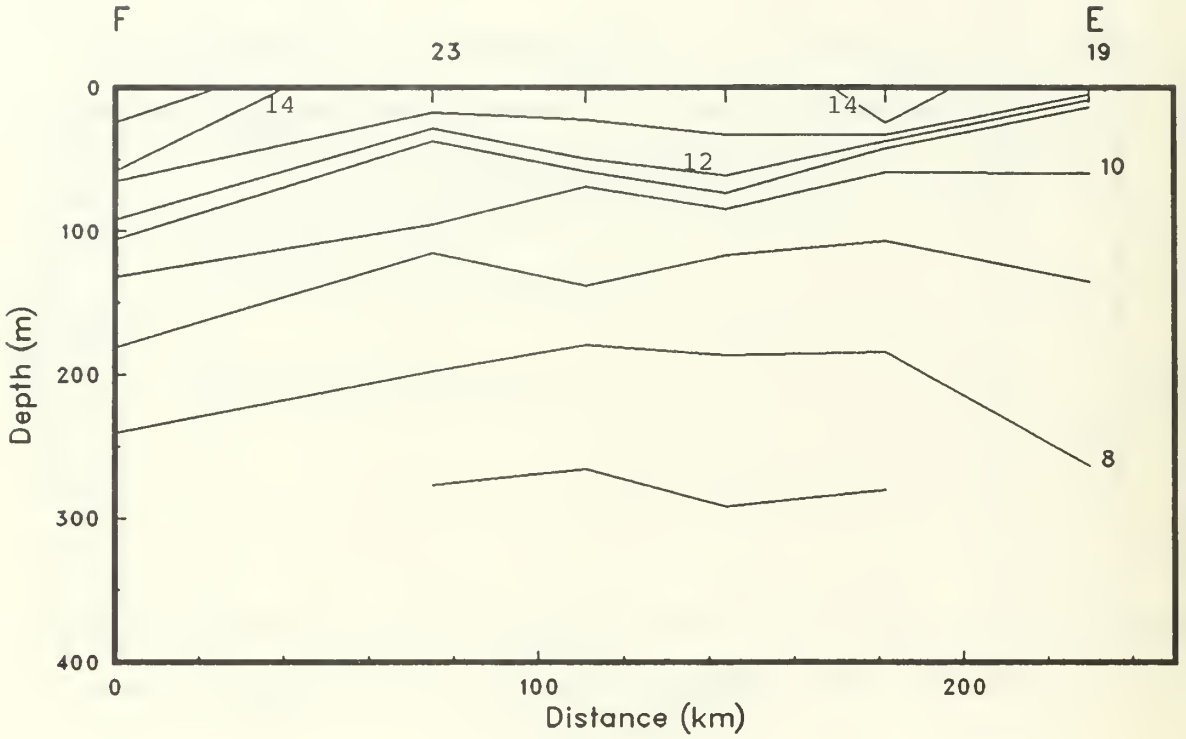


Figure 72(e).

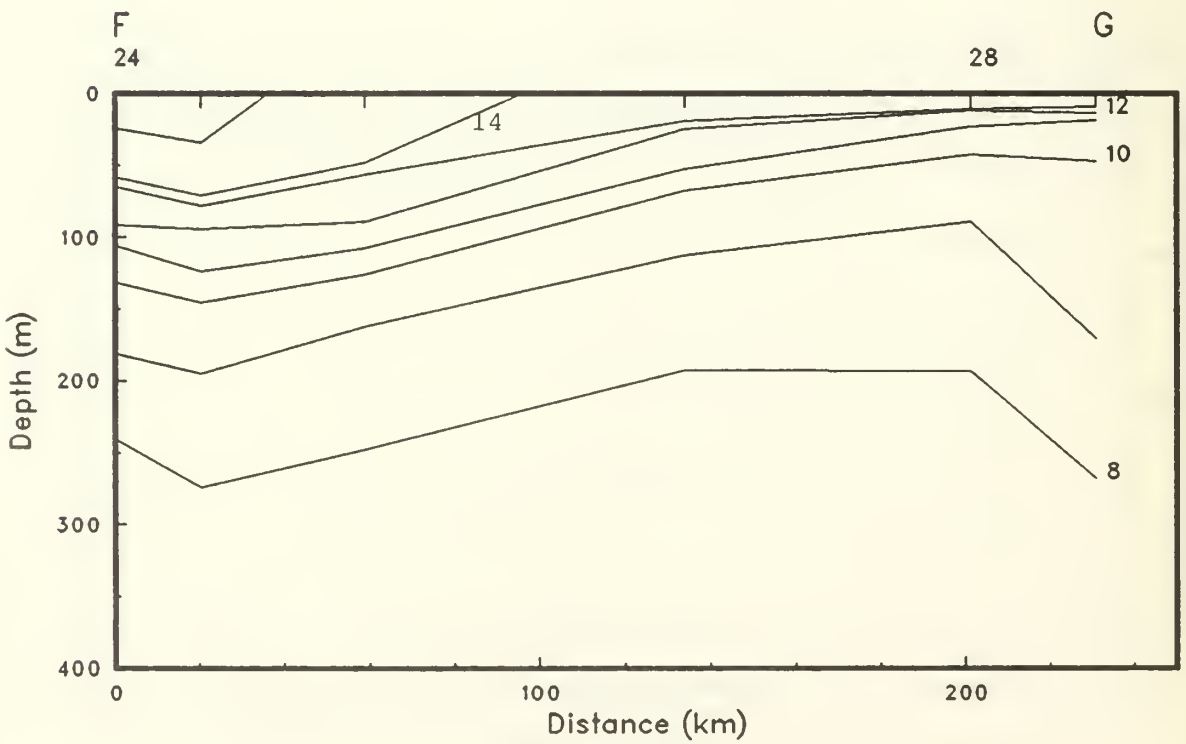


Figure 72(f).

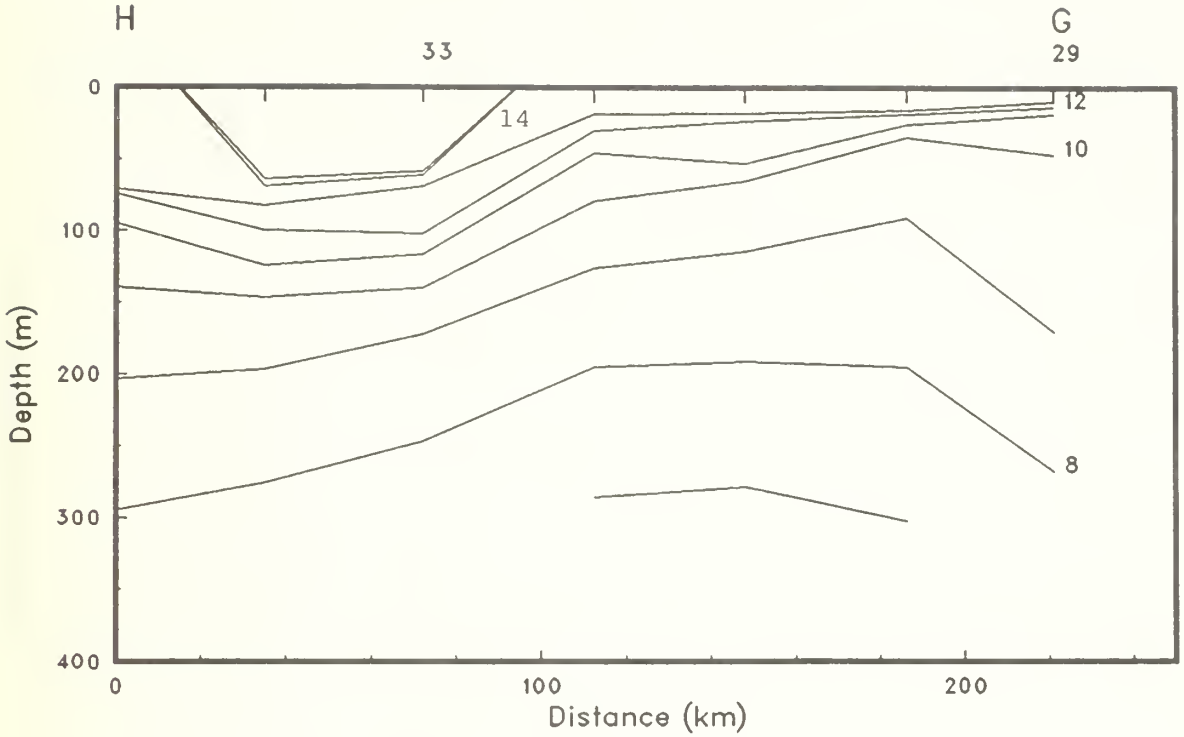


Figure 72(g).

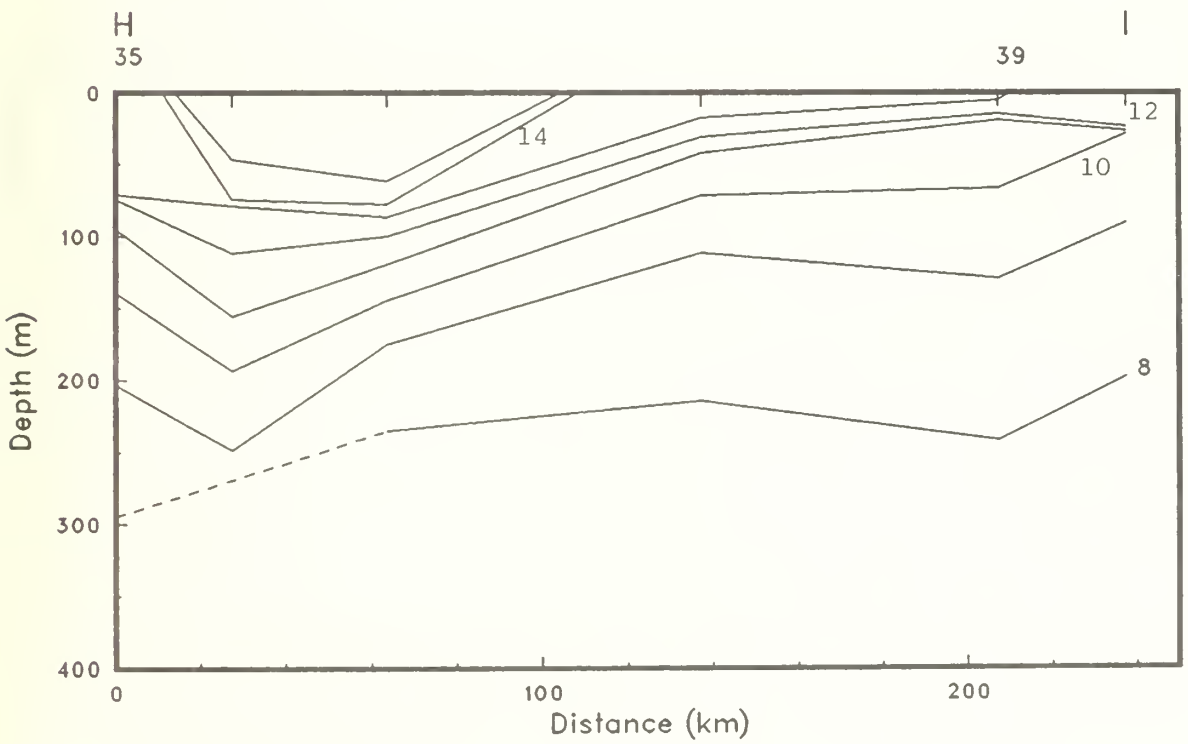


Figure 72(h).

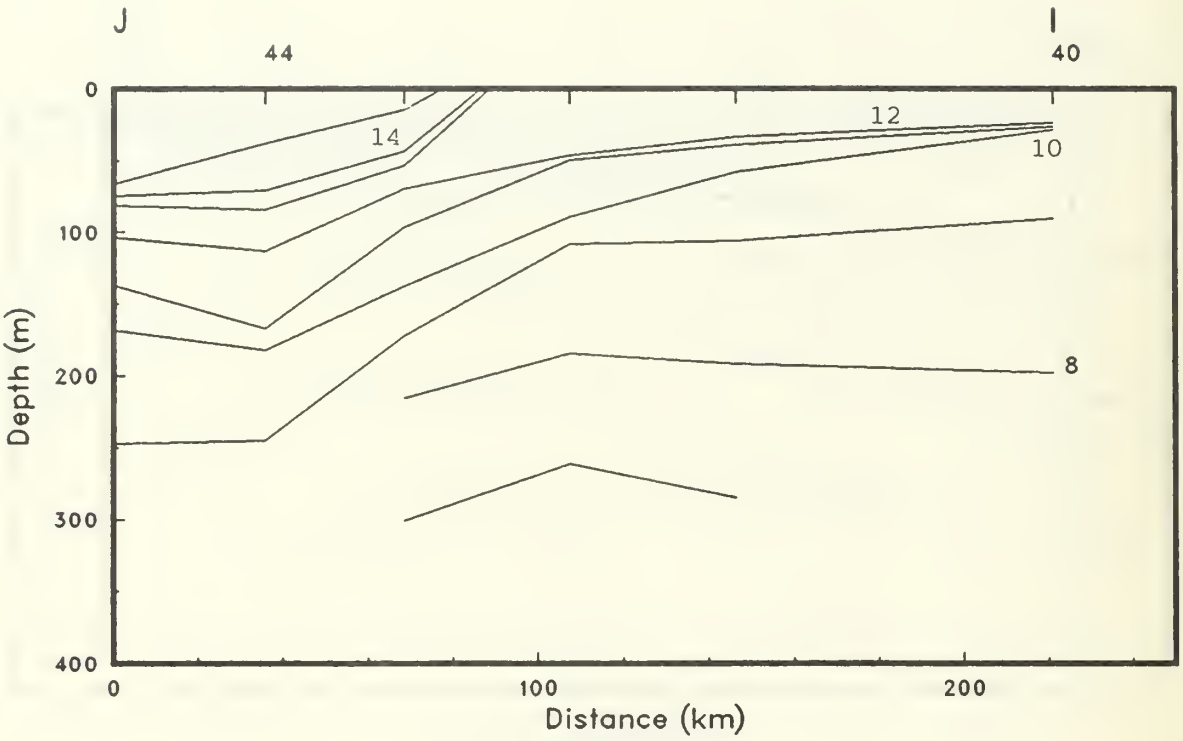


Figure 72(i).

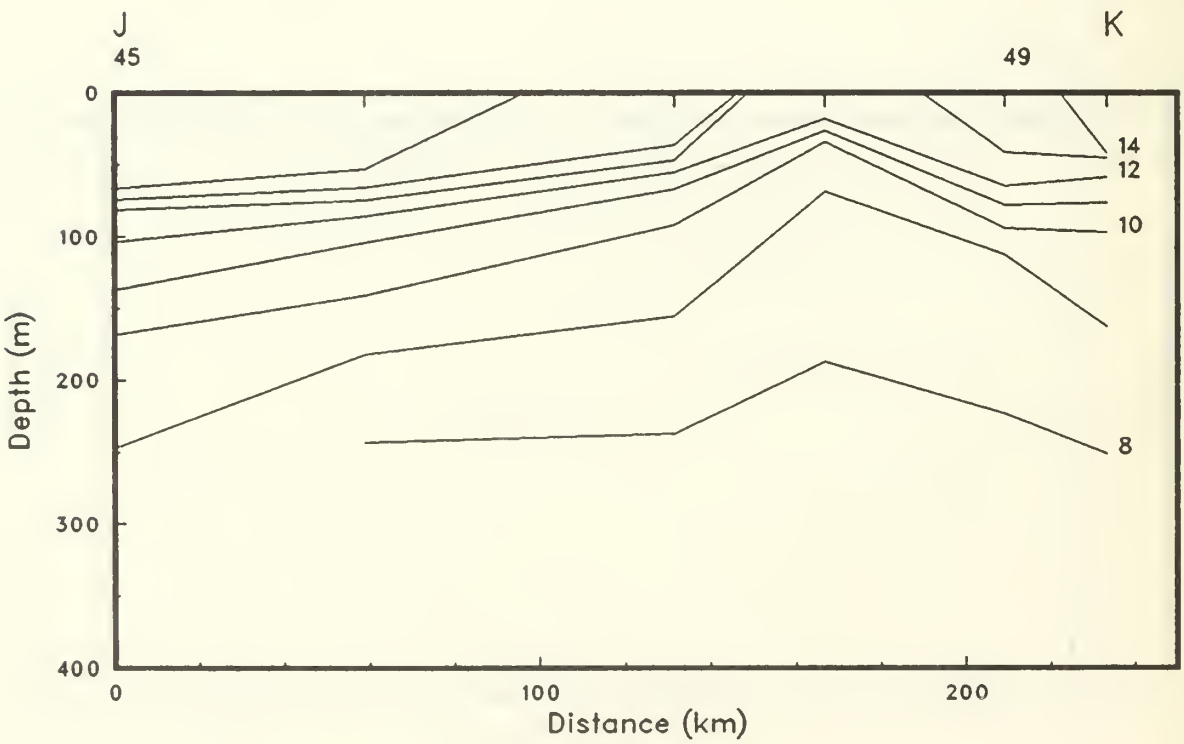


Figure 72(j).

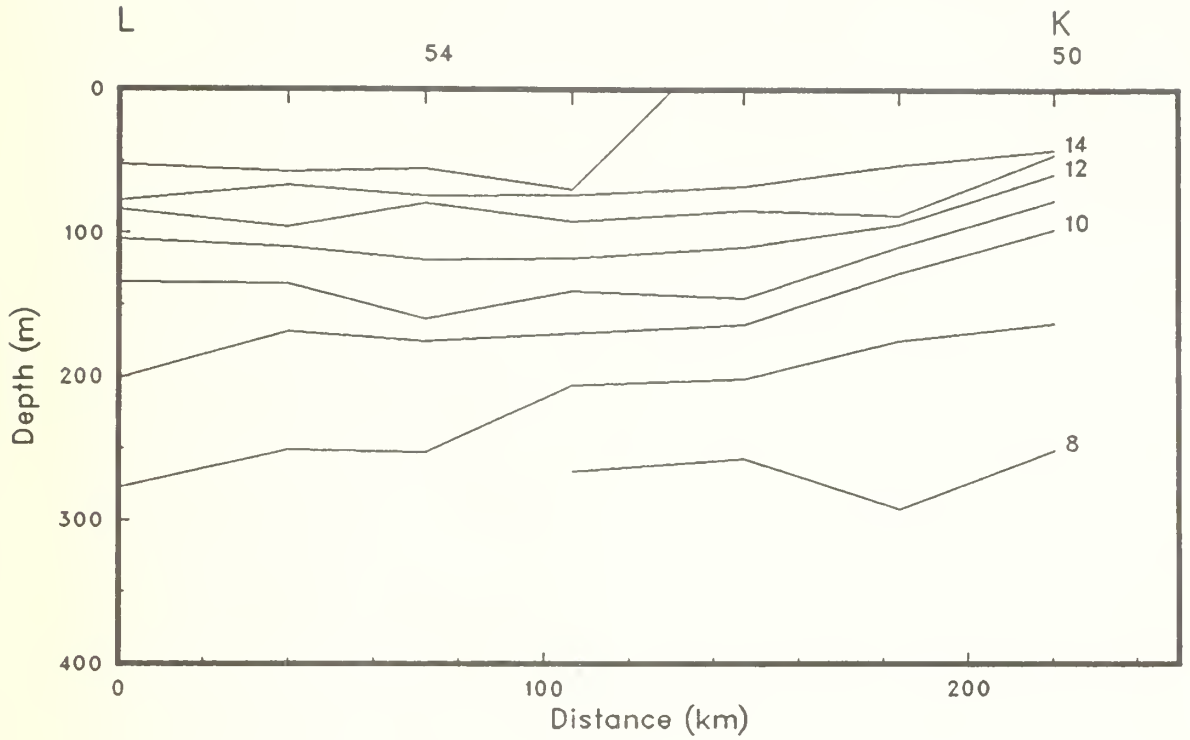


Figure 72(k).

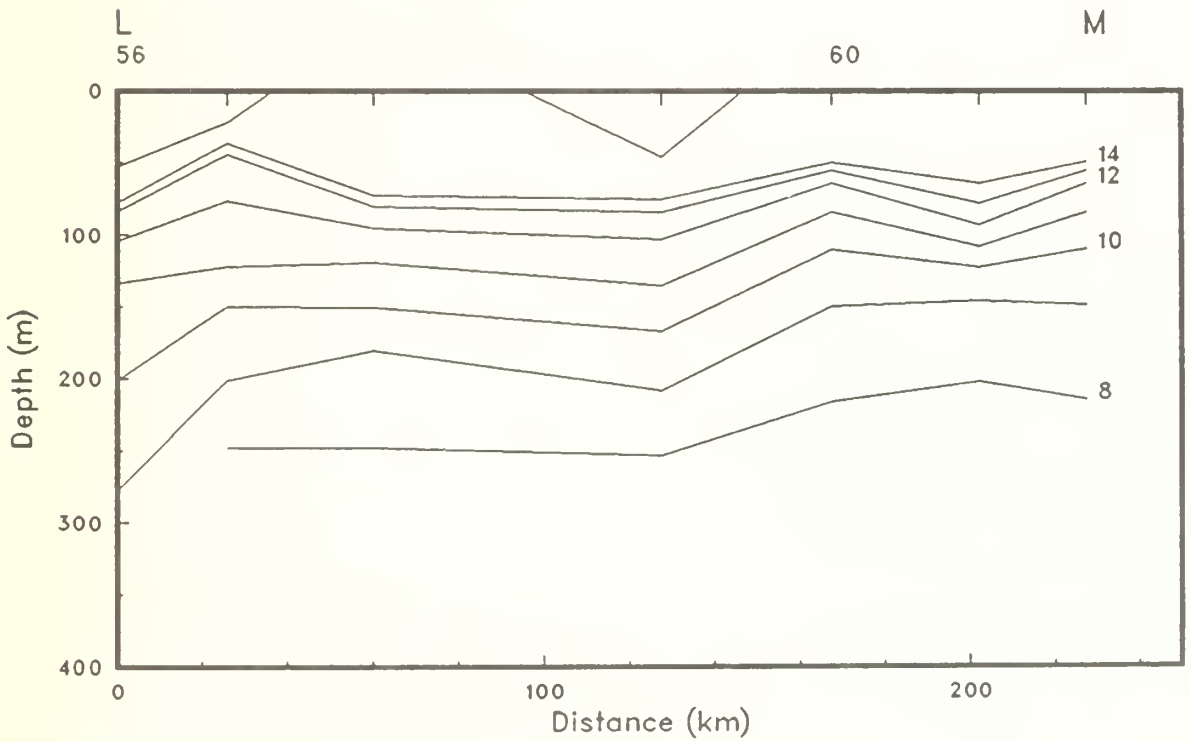


Figure 72(l).

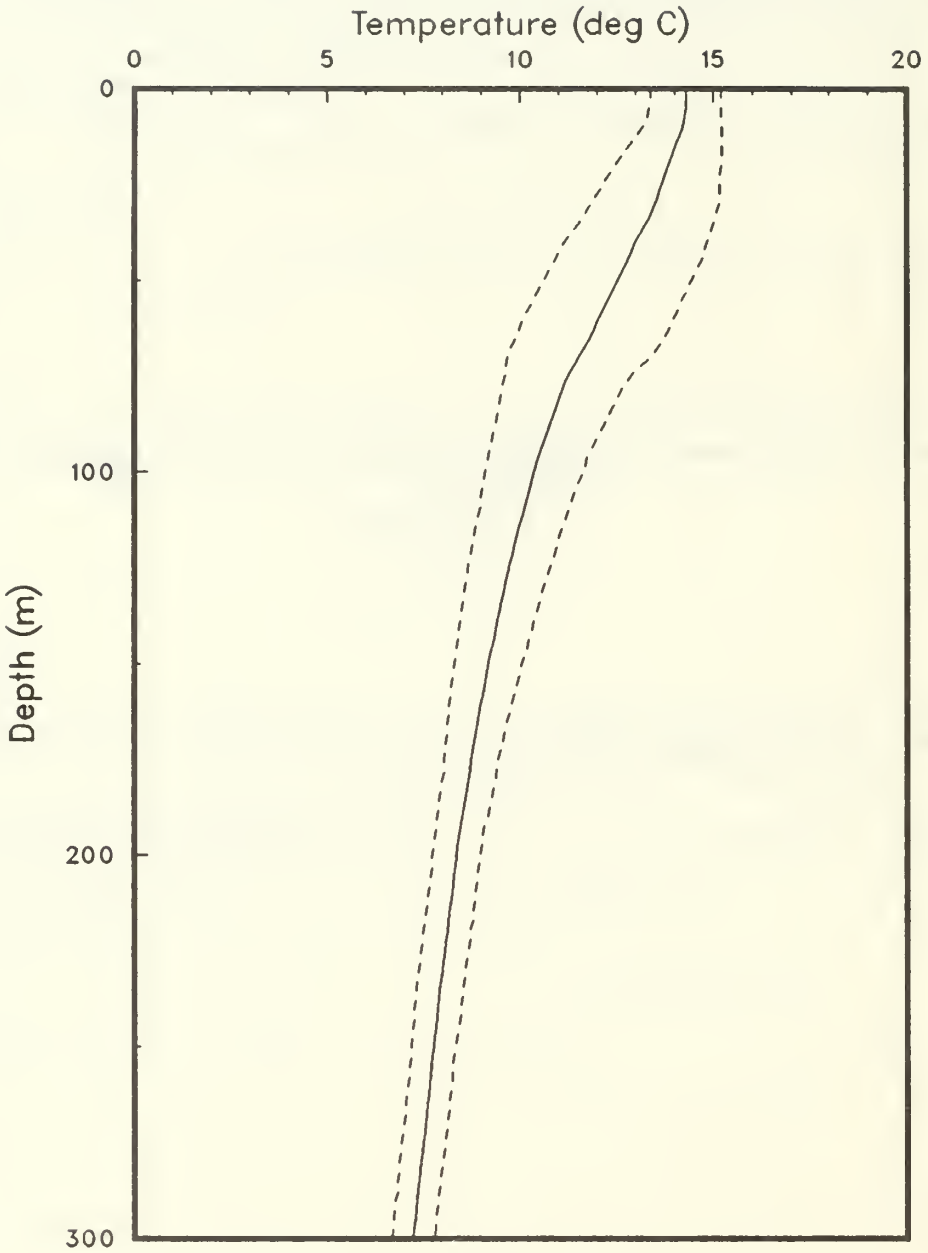


Figure 73: Mean temperature profile, with + and - the standard deviation. (OPTOMA11, Leg P).

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Lewis, E.L. and R.G. Perkin, 1981: The Practical Salinity Scale 1978: conversion of existing data. Deep Sea Res. 28A, 307-328.

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